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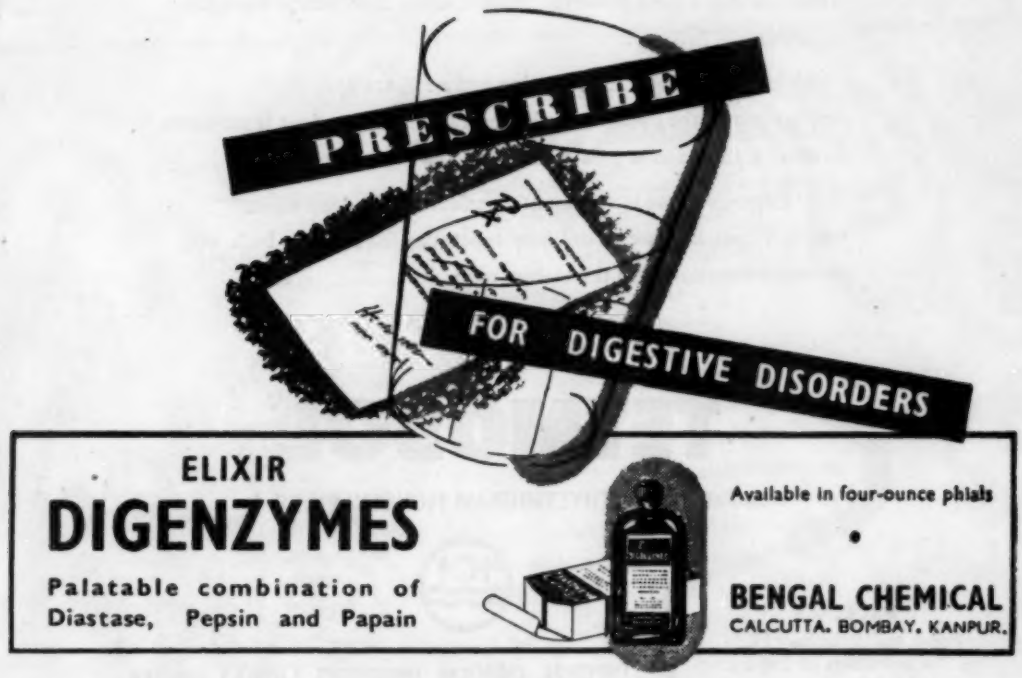

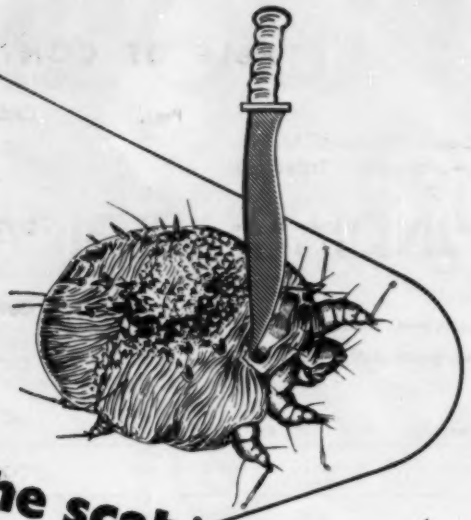

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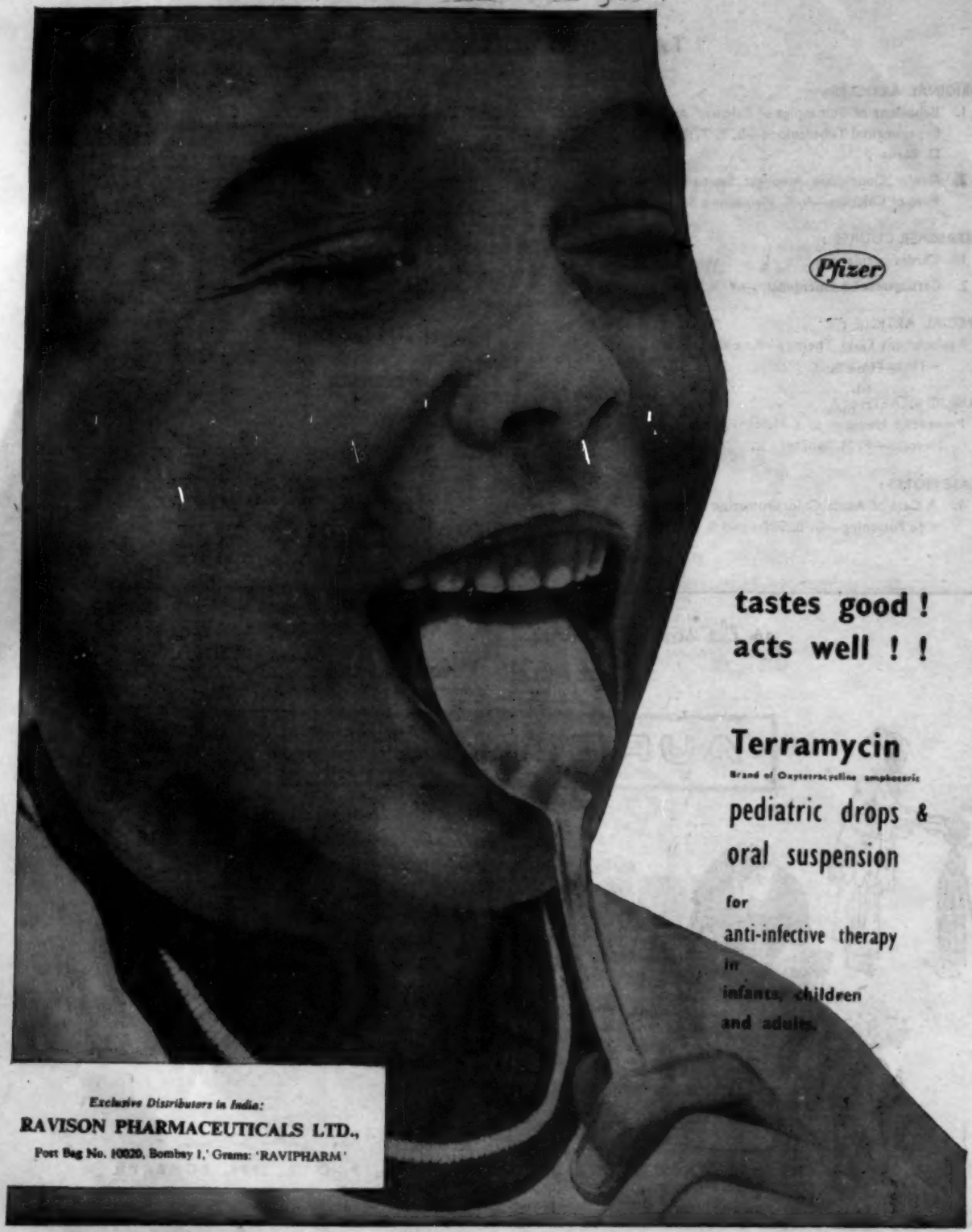
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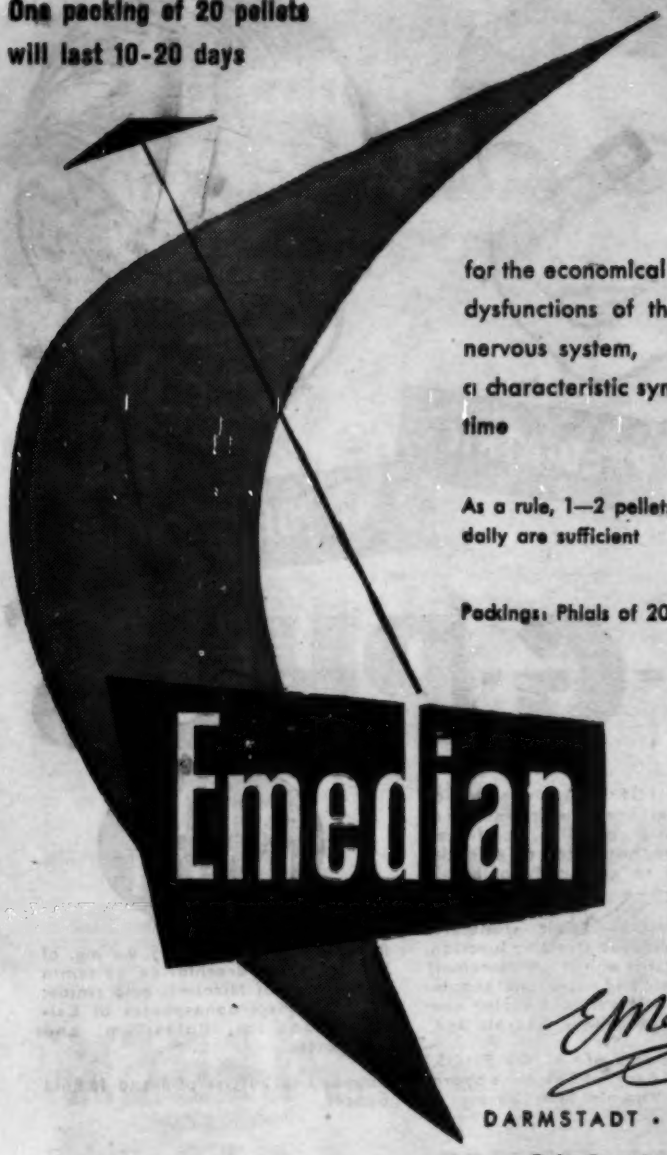

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CALCUTTA–26.

Journal of the
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Vol. 24, No. 14 CALCUTTA PUBLISHED TWICE A MONTH April 16, 1955

ORIGINAL ARTICLES

BEHAVIOUR OF GUINEAPIGS OF CALCUTTA AREA TO EXPERIMENTAL TUBERCULOSIS †

B. P. TRIBEDI AND D. BARUA,

Department of Pathology and Bacteriology,
Medical College, Calcutta.

The high susceptibility of guineapigs to both human and bovine types of the tubercle bacilli makes it indispensable in experimental work on tuberculosis. But during routine diagnostic work in our laboratory we have been using guineapigs supplied from outside for demonstration of tubercle bacilli in various materials of tuberculous patients with very disappointing results. In many cases we had culturally positive results though animal inoculation test was negative from the same material. On personal contact with other laboratories in Calcutta depending on same sort of supply of guineapigs we were informed of similar disappointing results by animal inoculation. This failure to produce lesion in these locally available guineapigs prompted us to take up the problem to see how these guineapigs actually behave to different doses of tubercle bacilli and to see whether these guineapigs also behave like Indian cattle which are more resistant to experimental inoculation as compared to the English breeds (Liston and Soparkar, 1917).

Methods and Materials

Bacteria—4 strains of *M. tuberculosis* of human type isolated from sputum, cerebrospinal fluid, bone and lymphnode were selected. They were isolated in Löwensten-Jensen medium and either the 1st or 2nd subcultures were used for animal inoculation.

Colonies were picked up by platinum loops from the medium and were weighed in chemical weighing bottles. They were then suspended in normal saline and then injected into the muscles on the inner aspect of the right thigh of guineapigs. The four strains were thus injected in different doses into 4 series of guineapigs of different weights.

Animals—23 healthy guineapigs of short-haired Angora type were used. These animals were supplied by a contractor from a village near Calcutta. The weight was recorded before giving the injection.

After inoculation the animals were housed in a separate room in wire-gauze cages, and kept on usual diet, viz., about 30 g. of soaked grams mixed with bran and green vegetables with sufficient water.

Weights of the animals were recorded weekly using the same weighing machine till the end of the experiment. Sedimentation rate was estimated every 2nd week by Westergren technique using blood from the heart

Tuberculin test was done 15 days after inoculation and if negative, was repeated later. 0·1 c.c. of 1 : 20 dilution of old tuberculin (5·0 mg.) was injected into the skin of the back after proper depilation. The result was recorded as + when the local induration was 10 mm. with erythema persisting for 48 hrs. or more. Bigger induration, necrosis and ulceration was recorded as "+ +", "+ + +" and "+ + + +" respectively.

† This preliminary report was read in the 5th Annual Conference of Indian Association of Pathologists held at Baroda in the month of November, 1954.

Some of the animals died and those who did not, were killed at the end of 12 weeks. Smear and cultural examinations were done to demonstrate the organisms in the lesions as well as in liver and spleen as a routine. Careful search was made for macroscopic lesions. Histological examination of the tissues were done when there was no typical lesion.

It was decided to note the progress of the disease in the animals by observing the sedimentation rate periodically. So before starting the actual experiment, normal sedimentation rate of healthy guineapigs weighing 200-600 g. was established by estimating E.S.R. of 50 such guineapigs. This was found to vary between 0·5—2·0 mm. in 1st hour and 1·2 to 3·5 mm. at the end of two hours.

Results—Results found in different animals by different doses of the organisms are shown in the annexed tables.

TABLE 1—STRAIN NO. R/37—ISOLATED FROM SPUTUM (STREPTOMYCIN SENSITIVE)

Sl. No.	Doses in mg.	Weights in g.			Tuberculin test	S.R. (mean of 2 hrs.) in mm.	Killed or died	Extent of lesions†
		Beginning	Highest	End				
1	0·1	390	450 (10th wk)	430	Negative	1·0	K (12th wk)	C+
2	0·5	487	546 (8th wk)	505	±	1·2	K (12th wk)	C+ (?y)
3	4	420	508 (6th wk)	490	+	1·4	K (12th wk)	C+± (?y)
4	6	367	423 (4th wk)	410	+	1·5	*D (9th wk)	C+± (?y)
5	0·1	220	280 (4th wk)	262	++	1·0	D (9th wk)	C++++
6	0·5	232	288 (3rd wk)	265	++	1·2	D (8th wk)	C++++
7	1·0	242	298 (3rd wk)	245	++	1·2	*D (4th wk)	C++

TABLE 2—STRAIN NO. R/41—ISOLATED FROM CEREBROSPINAL FLUID (STREPTOMYCIN SENSITIVE)

1	0·1	500	547 (10th wk)	515	Negative	1·2	K (12th wk)	C+
2	2·0	480	520 (12th wk)	520	+	1·4	K (12th wk)	C+± (?y)
3	0·1	240	265 (3rd wk)	267	++	1·8	D (9th wk)	C++++
4	0·5	242	290 (4th wk)	233	++	1·5	D (8th wk)	C++++
5	0·5	220	245 (5th wk)	235	++	1·8	D (7 wks)	C++++
6	1·0	240	305 (4th wk)	282	++	2·7	*D (8 wks)	C++++

TABLE 3—STRAIN NO. R/27—ISOLATED FROM PUS FROM STERNUM (STREPTOMYCIN RESISTANT)

1	0·1	210	—	190	++	1·5	D (5 wks)	C+++
2	1·0	207	—	177	+	1·5	*D (4 wks)	C++
3	0·2	193	230 (3rd wk)	175	++	1·2	D (5 wks)	C+++
4	0·1	450	495 (4th wk)	476	+	1·4	K (12 wks)	C++ (?y)
5	2·0	467	490 (4th wk)	470	+	1·2	K (12 wks)	C++

TABLE 4—STRAIN NO. R/39—ISOLATED FROM LYMPHNODE (STREPTOMYCIN RESISTANT)

1	0·1	485	508 (4th wk)	490	+	1·5	K (12 wks)	C+
2	0·5	520	535 (3rd wk)	525	+	1·4	K (12 wks)	C+
3	1·0	506	530 (4th wk)	515	+	2·0	K (12 wks)	C+ (?y)
4	0·1	236	262 (4th wk)	238	++	1·4	D (9 wks)	C++++
5	0·5	228	250 (3rd wk)	230	++	1·6	D (7 wks)	C++++

* Indicates death after collection of heart's blood.
† C+ —Localised caseation with enlarged inguinal glands with or without caseation.
C++ —Enlargement with or without caseation of common iliac, sub-lumbar, portal, mediastinal glands in addition to above.
C+++ —Enlargement of liver and spleen with no definite necrotic patches together with above.
C++++—Typical greenish yellow patches of necrosis in liver, greyish white necrotic areas in spleen and small gelatinous tubercles in lungs in addition to the lesions above.
C± —Intermediate grades of lesion.
y —Yersin type of lesion.

Discussion

In our series, guineapigs which were obtained from different villages in the suburbs of Calcutta, did not uniformly show characteristic lesions after injection of tubercle bacilli. The smaller guineapigs weighing between 200-250 g. did show characteristic lesions in all the cases though of varying degree. The bigger guineapigs weighing about 400 g. or more did not show any macroscopic lesion in liver, spleen and lung in 12 weeks. On histological examination however typical follicles of epithelioid cells with an occasional foreign body type of giant cell were seen in liver and spleen of some of these big animals. Acid-fast bacilli could be demonstrated in some of these lesions on staining by Ziehl-Neelsen method. These lesions conform to the lesions described as Yersin type. We are not in a position to say what would have happened to these lesions if the animals were allowed to live for longer periods.

No satisfactory explanation for this difference of susceptibility according to weight can be offered. Previous natural infection in the bigger animals would have explained this but such natural infection of guineapigs is very rare, moreover tuberculin tests in all the animals were negative even 15 days after injection of tubercle bacilli.

Saltys (1952) recommends guineapigs of the approximate age of 2 months, weighing between 300-350 g. Pandalai (1940) while working with the typing of tubercle bacilli noted down his observations in these words: "It has been the experience in this laboratory that the evolution of tuberculosis in guineapigs is comparatively slow, much slower than what is mentioned in text-books. In the great majority of cases it takes much more than 6 weeks to disclose any evidence of tuberculosis in the animal and emaciation and death are very late events".

Close (1946) while working on demonstration of tubercle bacillus in pleural fluid came to the conclusion that in the examination of pleural fluid, the guineapig was less reliable than the culture medium and that the value hitherto placed on the guineapig inoculation test was in need of revision. He examined 102 pleural fluids by both culture and guineapig inoculation and 34 gave positive results; 10 by both culture and animal inoculation and 24 by culture alone with negative animal inoculation test. He did not get a single case of positive animal inoculation with negative cultural result.

None of these two observers recorded the weight and source of the guineapig they used in their experiment which would be very interesting to know in the face of our findings.

Mangalik *et al* (1954) and Dhayagude and Shah (1948) could produce typical lesions in the guineapigs they used irrespective of weight but all their animals were either locally bred or obtained from a source of controlled breeding and rearing. Differences in natural resistance to tuberculosis of different animals, e.g., mice, rabbits, cattle, etc., according to their race have been definitely shown by different workers (Koch 1884, Laurie 1941, Pierce *et al*, 1917). To try to explain this difference of susceptibility of guineapigs in different places of India on this racial basis will be nothing more than hypothetical at this stage of work.

Sedimentation rate was not raised in any animals to any marked extent even on the day when it revealed extensive lesions on autopsy. No record of such observation in animals was seen in the available literature. In contrast to marked emaciation in human beings, lose of weight is not a constant feature in guineapig in experimental tuberculosis. Dhayagude and Shah (1948) recorded increase of weight in majority of their animals upto the end of their experiment. Mangalik *et al* (1954) recorded some gain in weight in the beginning but later on loss of weight was invariable. In our series almost all the animals, 21 out of 23, gained weight for 3-4 weeks—at times for longer periods, then the weight was lost to some extent but at the end the weight usually remained higher than that at the beginning of the experiment. Tuberculin test was positive in all the animals who showed generalised lesions on autopsy but never to the extent of ulceration. It was negative in those animals which did not take the disease.

We took this opportunity to see whether there was any difference in the virulence of the organism according to their streptomycin sensitivity. 2 of our strains, R/37 and R/41, were streptomycin sensitive and the other 2 strains were streptomycin resistant, but there was no difference in their virulence in the small guineapigs. This finding is in line with those of Steenken *et al* (1948) and Mitchison (1954) who reported that resistance to streptomycin or P.A.S. does not result in any loss of virulence. Isoniazid resistant strain is usually avirulent in guineapigs (Peizer *et al* 1953 and Steenten *et al* 1953).

Incidentally it may be mentioned that Peizer and his colleagues used guineapigs weighing between 200-250 g. for virulence test.

Summary

(1) 4 strains of recently isolated *M. tuberculosis* (human type) were injected in different doses intramuscularly into locally available 23 guineapigs of different weights.

(2) They were sacrificed after 12 weeks unless they died earlier and it was found that only the smaller guineapigs weighing between 200-250 g. developed typical lesions. The bigger guineapigs weighing about 400 g. did not show typical lesions within the period observed. This shows that guineapig inoculation test for *M. tuberculosis* is not always infallible.

(3) Histological examination revealed Yersin type of lesion in the liver and spleen of these bigger animals.

(4) Weight loss is not a significant feature of guineapigs in experimental tuberculosis.

(5) Sedimentation rate of guineapigs did not show any significant rise even when the lesions were extensive.

(6) Tuberculin test was positive in all the animals with generalised lesions and was negative in bigger animals which did not show typical lesions.

(7) The virulence of the streptomycin sensitive and streptomycin resistant strains used did not show any variation in our small series.

Acknowledgment

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OCULAR CONDITIONS AMONGST SEAMEN AT THE PORT OF CALCUTTA

A. K. MALLIK, M.B.B.S., D.P.H.,

Medical Officer,

Seamen's Medical Examination Organisation, Port of Calcutta.

AND

S. C. SEAL, PH.D., M.B.B.S., D.P.H., F.A.P.H.A.,

Professor of Epidemiology,

All-India Institute of Hygiene and Public Health, Calcutta.

In the present article, an attempt has been made to describe the different degrees of acuity of distant vision observed amongst seamen ratings. The following four categories of vision, based on the prescribed physical standards laid down by the Government for seamen, were accepted :

(*i*) normal vision (6/6 or 6/9 each eye)

(*ii*) nearly normal vision (6/12 one eye and 6/12 or better other eye)

(*iii*) poor vision (less than 6/24 each eye or less than 6/36 one eye and 6/12 other eye)

(*iv*) medium vision (better than poor vision but below nearly normal).

An attempt has also been made to discuss the causes of poor vision and their relationship with age and occupation. The ratings belonged to three departments of occupation, namely, deck, engine and saloon and they were considered under two broad age groups, viz., (A) below 50 years and (B) above 50 years.

Out of 11,042 seamen examined during 1952, 7,208 (roughly 66 per cent) had the same standard of vision in both eyes whereas the rest had asymmetrical vision. The distribution of acuity of unaided distant vision amongst seamen is given in Table 1.

It will be seen in Table 1 that the incidence rate of poor vision was highest in saloon department in the age group B. Otherwise the difference in the incidence rates of the visual standards in the three departments of occupation amongst persons belonging to either A or B age groups were not very sharp.

As already stated, every 'poor vision' case was subjected to further examination by the eye specialist in order to find out the cause of such poor vision and the degree of improvement of vision with glasses, as on the report of the specialist his further fitness for sea service was assessed.

TABLE 1—DISTRIBUTION OF ACUITY OF UNAIDED DISTANT VISION AMONGST SEAMEN ACCORDING TO THE DEPARTMENTS OF OCCUPATION

Standard of vision		Age group A (18—50 Yrs.)			Age group B (50+Yrs.)		
		Deck	Engine	Saloon	Deck	Engine	Saloon
Normal vision	No.	1813	1944	980	177	343	53
	per cent	63·0	58·8	60·5	16·5	22·4	8·4
Nearly normal vision ...	No.	474	489	274	198	308	103
	per cent	16·5	14·8	16·9	18·4	23·5	16·4
Medium vision	No.	458	689	255	340	545	179
	per cent	15·9	20·8	15·7	31·7	32·1	28·5
Poor vision	No.	131	187	112	359	337	294
	per cent	4·6	5·6	6·9	33·4	22·0	46·7

CAUSES OF POOR VISION

Out of 1420 'poor vision' cases, only 836 seamen (58·8 per cent) reported after obtaining the opinion of the eye specialists. The diseases observed and occupation in them are given in Table 2 and 3 respectively. The remaining 584 seamen (41·2 per cent) did not turn up even up to 8-12 months after they were referred to the eye specialist.

From Table 2, it will be seen that the principal known causes of 'poor vision' were (1) Errors of refraction bilateral—56·3 per cent; (2) Lental diseases, unilateral or bilateral—25·6 per cent; (3) Other eye diseases unilateral or bilateral—18·1 per cent.

Error of refraction, bilateral—Amongst 471 cases of bilateral error of refraction, 304 cases (64·5 per cent) had their visions corrected up to 6/9, or better, in each eye whereas 167 cases (35·5 per cent) had them corrected only upto 6/12 each eye, no further improvement being possible even though the fundus oculi and lenses were all healthy. In Table 3 it will be seen that the incidence rate of bilateral error of refraction remained practically same upto the age of 40 years, it was highest in the age group 40-50 years, and thereafter it declined. The difference in the incidence rates in the three departments of occupation amongst age group A or B was very small.

Lental diseases, unilateral or bilateral—The lental diseases noted among 214 seamen were lental sclerosis, cataract and aphakia (for details see table 3). All bilateral lental sclerosis cases had their vision improved only partially, namely, 6/18 each eye or 6/24 one eye and 6/12 other eye. In the aphakic eye, the vision could be improved with

TABLE 2—SHOWING CAUSES OF POOR VISION IN 836 CASES AS REPORTED BY THE SPECIALISTS

Causes	Diseases		No.
	One eye	Other eye	
1. Error of refraction bilateral (471 cases) ...	Refractive error	Refractive error	471
2. Lental diseases, unilateral or bilateral (214 cases)	Lental sclerosis	Lental sclerosis	77
	Cataract	Cataract	82
	do.	Aphakia	4
	do.	Refractive error	32
	do.	Other eye diseases	4
	Aphakia	Refractive error	13
	do.	Aphakia	2
3. Other eye diseases, unilateral or bilateral (151 cases)	Other eye diseases	Other eye diseases	45
	do.	Refractive error	70
	do.	Normal	30
Total—836			836

glass only upto 6/12 whereas practically no improvement was possible in cataract eye, thus resulting in partial blindness in the affected eye. The incidence rate of these diseases increased with age. In the age group A of the population it was highest in the deck department, the other two departments having practically the same incidence rate, whereas in the age group B of the population, it was highest in the engine department, the other two departments having practically the same incidence rate. (Table 3)

Other eye diseases, unilateral or bilateral—The types of diseases that were included in the 151 "other eye diseases" cases consisted of phthisis bulbi, amblyopia, choroiditis, optic nerve disease, retinal disease etc. In all these cases, no improvement or very little improvement with glasses was possible in the affected eye, thus resulting in total or partial blindness. In the age group A of the population the incidence rate was highest in saloon department, the other two departments having practically the same incidence rate whereas in age

TABLE 3—SHOWING CAUSES OF POOR VISION ACCORDING TO THE DEPARTMENT OF OCCUPATION

Causes	Occupation	Age group A (18—50 yrs.)			Age group B (50+yrs.)		
		Total population reported	Cases		Total population reported	Cases	
			No.	per cent		No.	per cent
Error of refraction, bilateral ...	Deck	105	56	53·3	129	72	55·8
	Engine	155	101	65·2	221	116	52·5
	Saloon	89	51	56·2	137	75	54·7
Lental diseases, unilateral or bilateral ...	Deck	105	22	21·0	129	40	31·0
	Engine	155	18	11·6	221	83	37·6
	Saloon	89	9	10·1	137	42	30·7
Other eye diseases, unilateral or bilateral	Deck	105	27	25·7	129	17	13·2
	Engine	155	36	23·2	221	22	9·9
	Saloon	89	29	33·8	137	20	14·6

TABLE 4—SHOWING CAUSES OF BLINDNESS

Type of blindness	Causes		Number of cases
	One eye	Other eye	
1. Unilateral total blindness (38 cases) ...	Phthisis bulbi	Refractive error	36
	Retinal detachment	do.	1
	Choroiditis	do.	1
2. Unilateral partial blindness (104 cases) ...	Cataract	Aphakia	4
	do.	Refractive error	32
	Amblyopia	do.	37
	Optic atrophy	do.	1
	Corneal opacity	Normal	18
	Choroiditis	do.	5
	Diseases of retina	do.	3
	Iridocyclitis	do.	4
3. Bilateral partial blindness (131 cases) ...	Cataract	Cataract	82
	do.	Choroiditis	2
	do.	Corneal opacity	2
	Corneal opacity	do.	4
	Diseases of choroid	do.	1
	do.	Diseases of choroid	11
	do.	Amblyopia	1
	Amblyopia	do	1
	Diseases of retina	Diseases of retina	8
	Diseases of optic nerve	Diseases of optic nerve	11
	Pterygium	Pterygium	4
	Trachoma	Trachoma	3
	Glaucoma	Glaucoma	1
Total			273

group B of the population it was lowest in the engine department but equally high in other two departments. (Table 3).

Blindness amongst Seamen

No improvement or very little improvement was possible in one or both eyes of 273 cases. They therefore remained totally or partially blind in the affected eye. The causes of such blindness are given in Table 4 (partial blindness being defined as inability to count finger at 20 ft.).

Assuming that the distribution of different eye diseases amongst 584 unaided 'poor vision' cases who did not turn up later was the same as found amongst 836 unaided 'poor vision' cases who reported later, the estimated percentage of 'blindness' (all types taken together) amongst the whole seamen population examined (11042) would be 4·20 per cent, and it increased as the age group advanced. In both A and B age groups, the incidence rate was highest in saloon department. (Table 5).

Table 5—Showing Estimated Percentage of Blindness amongst Seamen according to Departments of Occupation

Occupation	Age group A (18—50 yrs.)		Age group B (50+yrs.)	
	No.	Estimated percentage of total population	No.	Estimated percentage of total population
Deck ...	39	1·56	30	10·11
Engine ...	44	2·19	73	7·26
Saloon ...	32	6·91	46	15·69

Based on the above assumption, the estimated incidence rates of unilateral total blindness, unilateral partial blindness and bilateral partial blindness amongst whole seamen population examined would be 0·70 per cent, 1·6 per cent and 2·0 per cent respectively. In 94·7 per cent cases of unilateral total blindness, the cause was phthisis bulbi, in 70·3 per cent of unilateral partial blindness the causes were either cataract or amblyopia and in 62·6 per cent of bilateral partial blindness, the cause was cataract (there was no case of bilateral total blindness).

From Table 4, it will be seen that there were 122 cases of cataract, 45 cases of chorioretinal diseases including optic nerve diseases, 39 cases of amblyopia, 36 cases of phthisis bulbi, 25 cases of corneal opacity and 12 cases of miscellaneous diseases, causing either individually or in combination, 'blindness' amongst 273 seamen and their estimated percentages of incidence rate in the whole seamen population would be 1·86 per cent, 0·69 per cent, 0·55 per cent and 0·38 per cent.

Discussion

As the acuity of unaided distant vision amongst the general population of East Pakistan and West Bengal from which seamen of Calcutta are usually recruited is not known, it is difficult to make any comparative study. However, candidates (prospective seamen) aged 18-26 years, who were selected for entry into merchant navy as ratings were all subjected to medical examination before they went for sea service. The acuity of unaided distant vision observed amongst them is given in Table 6. From therein it will be seen that the percentage of normal vision amongst them was higher than the existing seamen (aged 18-30 years) who had voyage experience, thereby indicating that hazards of sea service might have possibly affected the eye sight of the seamen.

It is a known fact that since childhood as age advances the acuity of vision also deteriorates. In seamen also acuity of distant vision deteriorated as the age group advanced. In the age group below 50 years, the commonest cause of marked deterioration of vision was bilateral error of refraction, hence in most of the younger seamen the

Table 6—Showing Acuity of Unaided Distant Vision amongst Prospective and Existing Seamen

Visual standard	Existing seamen having voyage experience aged 18-30 yrs.		Prospective seamen aged 18-26 yrs. selected by Shipping Master, Calcutta		Prospective seamen aged 18-20 yrs. selected by West Bengal Govt.	
	No.	per cent	No.	per cent	No.	per cent
Normal vision	343	81·1	1540	93·5	909	90·9
Nearly normal vision ...	36	8·5	35	2·1	17	1·7
Medium vision	31	7·3	48	2·9	45	4·5
Poor vision	13	3·1	25	1·5	29	2·9
Total	423	100·0	1648	100·0	1000	100·0

vision could be improved while in the rest where improvement in both eyes was not possible, the principal eye diseases causing blindness were amblyopia and corneal opacity. In the age group above 50 years, the commonest cause of such marked deterioration of vision was cataract and chorioretinal diseases including optic nerve diseases, hence very little or no improvement was possible in majority of them, thus resulting in high percentage of blindness amongst elderly seamen.

Amongst the three departments of occupation, saloon ratings suffered most although it was expected that the engine ratings due to heat rays of the engine room furnace and deck ratings due to sun glare in the open deck of the ship would be suffering most. The exact reasons for such observation require further study.

According to Somerset and Ghosh (1951) roughly 0·25 per cent population (India and Pakistan) are totally blind with similar percentage partially blind who cannot earn their living without special assistance of blind welfare service. Among seamen who came up for medical examination prior to further engagement into sea service, there was naturally no case of bilateral total blindness and cases of unilateral (total or partial) blindness were not always prohibitive for further sea service, but roughly 2·0 per cent of seamen population were partially blind in both eyes and thus debarred permanently from further sea service. Thus it appears that the incidence of blindness amongst seamen is higher than in the general population.

Summary

1. Out of 11,042 seamen, the acuity of distant vision without glasses according to the standards enumerated at the outset were roughly as follows: —(a) normal vision—48 per cent; (b) nearly normal vision—17 per cent, (c) medium vision—22 per cent and (d) poor vision—13 per cent. The majority of the seamen (roughly 66 per cent) had symmetrical vision in both eyes.

2. Acuity of distant vision deteriorated as the age advanced. The saloon ratings suffered most from unaided poor vision.

3. Out of 836 unaided poor vision seamen who were examined by the specialists the principal known causes were bilateral error of refraction—56·3 per cent, lental diseases—25·6 per cent and 'other eye diseases'—18·1 per cent.

4. No case of total blindness was detected amongst the seamen examined. The estimated percentage of unilateral total blindness, unilateral partial blindness and bilateral partial blindness were 0·70 per cent, 1·6 per cent and 2·0 per cent respectively.

5. The estimated incidence rate of the different eye diseases causing blindness either individually or in combination, amongst the total seamen population were 1·86 per cent cataract, 0·69 per cent chorioretinal diseases including optic nerve diseases, 0·60 per cent amblyopia, 0·55 per cent phthisis bulbi, 0·38 per cent corneal opacity and 0·18 per cent miscellaneous. All these diseases increased as the age group advanced except amblyopia and corneal opacity which increased only after 50 years of age. The saloon ratings suffered most from these diseases.

Acknowledgment

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REFRESHER COURSE

CARDIOVASCULAR SYPHILIS

L. K. GANGULI, B.SC., M.D., M.R.C.P.,

Hony. Physician, N. R. S. Medical College & Hospitals, Calcutta.

Cardiovascular manifestations of syphilis are rare at present, and of all chronic cardiac diseases not more than 5 per cent are syphilitic in origin. It is a late manifestation of the specific disease, occurring as a rule but not invariably 15-20 years after the primary infection. Thus the majority of the cases we encounter in our day to day practice are between the ages of forty and fifty and for every 9 males only 1 female is affected.

Incidence of cardiovascular syphilis is dependent on the occurrence of primary syphilis. The ignorant who do not appreciate the value of prophylaxis and treatment are more vulnerable than the privileged who can afford early and complete treatment in case of infection. Thus the incidence of cardiovascular manifestations is greater in the working classes and in people of the lower income groups.

The majority of the clinical manifestations of cardiovascular syphilis is due to involvement of the arteries. The other uncommon lesions are

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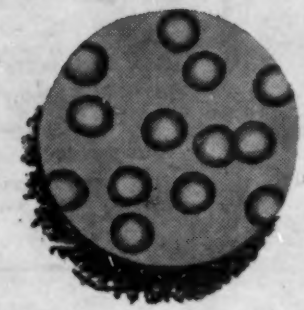

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gumma of the heart and diffuse syphilitic myocarditis.

DIFFUSE MYOCARDITIS: Diffuse syphilitic myocarditis is a rare entity. It is said that it is one of the causes of sudden death.

GUMMA OF THE HEART: In common with the occurrence of the same lesion elsewhere gumma of the heart is a rarity. If it occurs at all it is as a rule situated in the septa, particularly coming into clinical importance when it is situated in the upper part of the interventricular septum. In this situation the involvement of the conducting system leads to various types of heart block, even producing Stokes-Adam syndrome.

SYPHILIS OF THE ARTERIES: Syphilis is one of the outstanding cause of arterial disease. The organisms show a prediliction for the small arteries and the vasa vasorum of the bigger arteries. Of the small arteries the cerebral arteries bear the brunt. Syphilitic involvement of the coronary arteries is very rare, and whatever symptoms occur are not due to the direct effect of the spirochaetes but are secondary to deficient coronary circulation as a result of involvement of the ostia. Of the larger vessels vasa vasorum of the aorta is most commonly and severely affected.

AORTITIS:

Site—The lesions are common in the ascending part and arch of the aorta which are richly supplied with lymphatics and occasionally occurring 1-2 inches above the aortic valves and then spreading upward and downwards. Rarely other portions of the aorta may be affected. The particular localisation is explained by the fact that the spirochaetes are filtered in the pulmonary vascular bed into the lymphatics, reaching the mediastinal lymph flow. From here they travel via the perivascular lymph spaces of the vasa vasorum of the aorta.

Pathology—The essential pathology being the same everywhere the basic lesion is in no way different at this place also. The picture is of a chronic inflammatory process. There is infiltration with lymphocytes and plasma cells and oedema during the acute phase followed by healing by fibrosis and scar formation.

The earliest changes are seen in the adventitia. The inflammation spreads from here to media. The conspicuous changes not only occur along the vasa vasorum, but are perivascular too. The vasa vasorum is surrounded by a collection of lymphoid and plasma cells, often with necrosis resembling gummatous lesion. The lumen of the vessel is obliterated due to proliferation of intima, thus leading to gradual obliteration of the lumen of the vasa vasorum, i.e., endarteritis obliterans. As a result the media of the aorta consisting of musculo-elastic tissue suffers from lack of nutrition. The effect is destruction of the musculo-elastic element of the vessel. The spirochetes remain active for years and thus the lesion is progressive. The healing process is slow. There is no regeneration and repair is by fibrous tissue replacement. Fibroblastic proliferation derived from adjacent connective tissue takes place. This leads to patchy irregular scar tissue formation in the media. There is compensatory thickening of intima overlying these areas. The smooth intima is thrown into longitudial folds and appears nodular, thickened and puckered with characteristic stellate scars. There is no ulceration or calcification.

The coronaries—The involvement of the coronaries is not direct. The mesaortitis heavily affecting the region of sinuses of Vassalva and the oedema of the active phase around the ostia of the coronaries lead to diminished coronary inflow. This diminished flow may be sufficient for the nutritional needs of the heart at rest but is quite insufficient when demand is more during an exertion, causing a sense of discomfort and substernal oppression simulating angina of effort.

The valvular lesions are commonly limited to the valve commissures. Sometimes the free margin is also affected giving rise to a rolled up appearance. During healing there is shortening of the cusps in transverse direction resulting in incompetence. There are no adhesions between the cusps nor is there any calcification.

Because of loss of elastic tissue the ring dilates and causes a leak.

Signs and Symptoms—Syphilitic aortitis is often symptomless not only in its early stage, but also in the advanced stage too. Diagnosis is often accidental e.g. during systemic examination for other diseases or during mass radiography or on a post-mortem table. In early stage in some patients there is constant high retrosternal dull ache specially at night—the night pain.

The whole symptomatology is based on the resultant effect produced by the syphilitic inflammation of the aorta. As a result of aortitis three things happen:

(1) Involvement of the coronary ostia, giving rise to dyspnoea and pain on exertion i.e. effort angina. It is of course not suggested that all effort angina indicates syphilitic aortitis. Sometimes even coronary occlusion can occur giving rise to myocardial infarction. (2) Thickening of the commissures of aortic cusps and the dilatation of the rings (50 per cent) resulting in aortic incompetence. (3) Replacement of musculo-elastic tissue causing dilatation of the aorta.

Before the involvement of the valves, simply due to the dilatation of the aorta, there are increased dullness at the base, a systolic murmur in the aortic area and a markedly accentuated aortic second sound. Systolic thrill may be present. In asymptomatic and uncomplicated cases in the absence of hypertension a systolic murmur over the aortic area with accentuated second sound has been laid down as a digonstic criterion.

Aortic Incompetence: Dyspnoea on exertion, blackouts (fainting), sensation of throbbing—an early diastolic murmur—left ventricular hypertrophy, pulsatile arteries of the neck and a collapsing pulse are the usual features of aortic incompetence. In long standing cases symptoms are due to left ventricular decompensation giving rise to paroxysmal dyspnoea or even cardiac asthma. Hypertrophy of the heart is the rule in syphilitic aortitis and is conspicuous in incompetence. An early diastolic murmur over the aortic area often conducted down across the sternum towards the apex of the heart, is also audible.

Aneurysm of the Aorta: Aneurysm formation occurs in 10 per cent of cases. The single greatest factor in the production of aneurysm is the loss of musculo-elastic tissue. The aneurysm may be fusiform or sacular. To start with pressure symptoms are the main manifestations of which dysphagia is earliest. Pain due to erosion of bones, hoarseness due to pressure on left recurrent laryngeal nerve, and difficulty of breathing are commonly complained of. Inequality of pulse and blood pressure in two arms and systolic pulsation over the right second intercostal space are early signs. A pulsating tumour on the chest is a late sign. Tracheal tug is characteristic of aneurysm of the arch. Dullness at the base of the heart exceeding 2½" and a systolic and diastolic murmur and accentuated second sound are diagnostic. Later there is strain of left ventricle and left ventricular decompensation sets in.

Diagnosis

Associated findings—In 35 to 40 per cent of cases the diagnosis may be confirmed by the presence of associated signs and symptoms of neurosyphilis.

Skiagraphy—In 30 per cent of cases no radiological findings appear unless the condition has advanced or is associated with atherosclerosis, when the aorta may unfold and elongate. When the ascending part only is involved, a fusiform shadow gradually merging upwards into the normal lumen of the aorta is seen. In the advanced stage there is a general widening of the aorta. The arch becomes prominent and the cardiac shadow is enlarged due to left ventricular hypertrophy.

Serology—W.R. is positive in 85 per cent of cases.

Electrocardiography—In the early stage persistent RS-T segment depression denotes aortitis. In late stage of the disease, an idea about the left ventricular hypertrophy is obtained.

Syphilitic aortitis giving rise to effort angina ought to be differentiated from effort angina due to direct coronary involvement. Serology and electrocardiographic examination will help us in this matter. In older patients the presence of clacification, and a very marked systolic thrill on the right side of the sternum favour the diagnosis of atherosclerosis. Aortic sternosis is not compatible with the diagnosis of syphilitic involvement of the aorta. It ought to be remembered that both syphilitic aortitis and atherosclerosis may be present in the same individual. Most important is the differentiation from rheumatic lesions. The onset of the disease at an early age, and the presence of a mitral valve lession even in the absence of any suggestive past history are to be taken as rheumatic in origin. The difficulty will arise when only aortic incompetence is detected in a middle aged person. Serology is the only means in these cases to arrive at a conclusion.

In case of an aneurysm, confusion may arise. Tumours of other mediastinal structures may simulate some of the clinical and radiological pictures. But associated gross enlargement of the heart always favours an aortic lesion.

Course and Prognosis

Syphilitic involvement of the aorta is insidious and slow. Being a progressive disease, it is lethal. In advanced cases the therapeutic prospect is bleak. After diagnosis the usual life span is three to four years, even with good therapy and a strict regime. With aneurysm the maximum expectation of life is four years. Prognosis is very bad with associated congestive cardiac failure and severe effort angina. The size of the heart bears a distinct relation to prognosis, in persons with aortic incompetence. The greater the hypertrophy the lesser is the expectation of life. Prognosis is also related to physical activity. A person who can well afford to retire and live an inactive life has definitely an advantage over an wage earner and a manual worker. Death often is due to cerebral vascular accidents. Rupture of aneurysm, cardiac asthma, coronary occlusion and a very vigorous antisyphilitic therapy may terminate life suddenly.

Treatment

Individual experiences not being the same there are difference of opinion, but all agree in rest as a single therapeutic measure of value when the disease is active.

Specific treatment—Vigorous antisyphilitic treatment is harmful. It has been seen that when antisyphilitic treatment is instituted, there is a flaring up of the activity. Thus the already narrowed ostia of the coronaries may get completely occluded and a fatal result may precipitate due to the therapeutic shock. To avoid Herxheimer reaction, it is always better to choose a less potent drug at the start. It is safe to begin with potassium iodide by mouth starting with a small dose of 15 grains a day and ending with 45-60 grains a day for about a fortnight. It is particularly recommended in aortitis and aneurysm of the aorta where it is beneficial.

The treatment may be started with a course of bismuth, as salt or as soluble compounds (0·1 g. intramuscularly twice a week for three to four weeks). This may be followed by injections of penicillin which is the drug of choice. The first few doses being 30,000-50,000 units a day and then gradually rising to 400,000-600,000 units a day till the total dose is 6-10 mega units. Another course of 6 mega units may be repeated after 3 months. The toxic arsenical compounds may better be withheld. Improvement is noticed by the amelioration of breathlessness and substernal ache and absence of effort angina. Elderly patients are not much benefited.

Symptomatic treatment—Narcotics may be freely used to give relief from pain due to erosion by aneurysm. In severe cases paravertebral block may be advised. For effort angina of luetic origin the nitrites are not efficacious.

Wassermann Reaction and the Treatment

The W.R. is always elusive. On three monthly observations in some patients the W.R. gradually falls down and ultimately becomes negative, others show no change at all. It is always helpful to get a quantitative result than merely 'positive', and after a course of antisyphilitic treatment during the follow up period the titre levels should always be interpreted by comparison with the original. The significance of persistent W.R. is problematical in adequately treated cases. It may be due to 'a focus of spirochetes sealed off' from the effect of the treatment or may be a permanent change in the metabolic nature of the cells.

CARDIOVASCULAR EMERGENCIES

V. V. SHAH, M.D., M.R.C.P. (EDIN. & LOND.),
Hony. Physician, T. N. Medical College Bombay.

Acute heart conditions require the most urgent treatment and if properly diagnosed, many lives can be saved and recovery hastened. I explain how to make a bedside clinical diagnosis and apply immediate practical measures when confronted with such a situation. The common emergencies are (1) acute cardiac dyspnoea as a manifestation of acute left ventricular failure and pulmonary oedema ; (2) cardiac pain due to acute coronary insufficiency or coronary thrombosis ; (3) syncopal attacks ; (4) tachycardia due to various causes.

Acute Left Ventricular Failure and Pulmonary Oedema

The common causes responsible for acute L.V. failure are hypertension, coronary disease and aortic disease. Tight mitral stenosis as cause of pulmonary oedema with or without auricular fibrillation is also not uncommon. The patient suddenly wakes up after midnight or in early hours of the morning with difficulty in breathing and sense of suffocation, sitting up in bed. It is associated with restlessness, anxiety and perspiration, having quite often irritating cough bringing out at intervals blood-stained frothy sputum. The signs are : Enlargement of the left ventricle, i.e., apex beat felt down and out and heaving, gallop rhythm, second sound in the pulmonary accentuated, pulsus alternans, pulmonary basal congestion with rales at the bases, may be expiration prolonged with rhonchi or in marked cases with coarse rales all over the chest, amounting to a typical picture of acute pulmonary oedema, with frothy pinkish sputum coming out of nostrils and mouth. Enquiry should be made about the history of recent or remote coronary thrombosis, blood pressure for hypertension should be recorded and careful examination for aortic murmur especially diastolic is essential as their presence gives added evidence.

The history of many years' duration of attacks of dyspnoea in contradistinction to the short duration in paroxysmal cardiac dyspnoea, often younger patients, frequently obtained history of adrenaline having been injected to relieve the dyspnoea, expiration prolonged with rhonchi present, leave no doubt that it is bronchial asthma and not cardiac. ECG does help in a doubtful diagnosis, showing evidence of L.V. hypertrophy or of coronary

disease with myocardial injury or infarct pattern while ECG is essentially normal in patients of bronchial asthma except that P wave in L2, L3 may be tall and sharp suggestive of chronic pulmonary disease and emphysema.

A patient at or near the age of 60, having B.P. of about 160 to 170 mm. of Hg. systolic and about 80 to 90 diastolic complaining of cough with dyspnoea, may make one associate such a raised B.P. with dyspnoea and lead to a diagnosis of acute L.V. failure as the cause of dyspnoea. Such is not an infrequent emergency in practice. Proper history of long-standing cough with expectoration, probably history of fever due to respiratory infection, clubbed fingers, emphysema and undue cyanosis should make one think of pulmonary condition as the cause of dyspnoea. This type of raised B.P. is not uncommon in old people and bronchitis being also quite frequent at this age, such hypertension is to be neglected and is usually due to arteriosclerosis of larger vessels and treatment directed towards respiratory infection and bronchospasm in the form of antibiotics, bronchodilators like aminophylline and even ephedrine, oxygen, expectorants, etc. I am drawing attention to this because if morphia is injected in such cases it may be disastrous.

Treatment—Sitting or propped up position which the patient himself will take up and morphia with atropine or pethidine will be all that may be required in a slight or early case ; but if the congestion is marked either in recurrent attacks or in severe attacks, aminophylline 0·24 to 0·48 g. diluted with glucose given very slowly taking about 3 to 5 minutes and oxygen in high concentration are indicated. In spite of these measures, if the patient is not relieved, strophanthin or digoxin I.V. should be given provided no digitalis has been given in the last 10 days, and a mercurial diuretic should be injected. In hypertensive L.V. failure which is resistant to such treatment, bloodless phlebotomy, i.e., application of B.P. cuffs or letting out 400 to 500 c.c. of blood would be life saving and should not be delayed. This and digitalis of course are contraindicated in patients having coronary thrombosis as the cause of L.V. failure and pulmonary oedema. The question of administering digitalis to a patient having myocardial infarct and L.V. failure, is controversial but I am of the opinion that for the first three weeks, digitalis should as far as possible be withheld. If one is confronted with such a situation, one should use procainamide solution during digitalis therapy to prevent ventricular arrhythmias. If the hypertension is marked and does not lower by sedation, aminophylline etc., it is better to inject hexamethonium bromide and try to lower the B.P. by repeated injections as the heart may not cope with the resistance against which it has to work.

Cardiac Pain

Angina pectoris patients do not usually present an emergency as they usually see us in between the attacks of pains. They know that halting or a quiet rest and nitroglycerine are the remedies *par excellence* during the attacks of anginal pain. Prolonged cardiac pain due to acute coronary insufficiency or coronary thrombosis is one of the commonest emergencies. Cases of coronary thrombosis may be of varying severity. There may be a patient with pain only for a few hours and no other symptoms or there may be other cases with prolonged pain for a day or two with marked state of shock and dyspnoea. Between these cases there are cases of varying clinical grades. Pain is nearly always present, rarely absent or insignificant while the other two symptoms of shock or dyspnoea predominate. A patient may have pain and marked shock with no dyspnoea or he may have pain and marked dyspnoea with very little shock state or quite often there are pain, shock and dyspnoea together with varying degrees of severity. Clinical data about the site, character, duration and radiation of pain, restlessness and perspiration are quite important and should be carefully noted. Triple rhythm is quite an important and not uncommon sign which tells us that something is wrong with the heart ; but for this, in a large number of cases, physical examination is not helpful in the diagnosis. It is in this disease that ECG has been of the greatest aid in diagnosis, showing typical changes of infarct or injury. First ECG, taken soon after, may show evidence of myocardial ischaemia or may show non-specific changes or may be rarely normal but serial electro-cardiography is practically never negative and if repeated ECG's are negative, then the pain is not due to coronary thrombosis and myocardial infarct.

Treatment—Pain, shock and dyspnoea with varying severity have to be treated. For the relief of pain and restlessness, pethidine 100 mg. and morphia with atropine and codeine should be used. If the pain is less marked, smaller dosage of these drugs or codeine only should be used.

Mild and short lasting state of shock is quite common and does not require any active treatment; but a severe state of shock especially when it is persistent, does add to myocardial ischaemia and consequent necrosis and therefore it is advisable to combat it. P-methyl aminoethanol phenol tartarte—1 amp. 1 c.c. subcut. or I.M. every 2 hours till B.P. is raised to low normal levels. It

may also be given orally—10 per cent solution 20 to 30 drops frequently. If still unresponsive and B.P. remains 80 mm. of Hg. or below with very low pulse pressure and the patient pulseless, l-noradrenaline bitartrate 2 mg. in 500 c.c. 5 per cent glucose should be given as a slow I.V. drip infusion, bringing about a smooth rise of blood pressure, the rate being adjusted as indicated by frequent readings of B.P., the aim being to keep the systolic pressure between 100 and 110 mm. of Hg. The process of discontinuation of the infusion should be very gradual to avoid a dangerous fall in systolic pressure. The treatment of L.V. failure (dyspnoea, etc.) in recent coronary thrombosis is to follow the same lines except that digitalis and phlebotomy are contraindicated. Mild signs of failure in the form of slight basal congestion, are quite common and do not require active treatment, responding well to pethidine or as days pass, congestion disappears. But if dyspnoea is marked with more than minimal degree of congestion, oxygen in high concentration and aminophylline are indicated. If the B.P. is low, aminophylline with procaine should be given I.M. but if the B.P. is not low, I.V. aminophylline diluted with glucose can be safely given slowly. Atropine is of very little value in pulmonary congestion of L.V. failure but it is a useful drug in early stages of coronary thrombosis when along with fall of B.P. there is also in some cases marked bradycardia giving rise to syncopal state due to vagal effect, when it must be injected. Routine anticoagulant treatment in every case of coronary thrombosis is not necessary. All those with myocardial injury pattern or acute coronary insufficiency without transmural infarct are treated without anticoagulants, mainly with coronary dilators, but those with transmural infarct, in my opinion, should be given anticoagulant treatment. Frequently recurring anginal pains at rest, without ECG evidence of infarct and resistant to usual treatment, should be treated with anticoagulants to prevent coronary thrombosis.

Syncope

It means transient loss of consciousness of sudden onset due to inadequacy of cerebral blood flow. The causes are many, viz., cardiac, vasovagal, cerebral and anoxic, but the commonest cause is vasovagal or vasomotor syncope.

Cardiac: Stokes-Adams' syndrome with ventricular asystole is commonest in this group, though there are other causes like aortic stenosis, paroxysmal tachycardia, massive pulmonary embolism, cardiac tamponade, and ball valve thrombus. Stokes-Adams' fit more often occurs when the partial A.V. block increases in degree with marked slowing of cardiac rate or brings about transient complete blockage; but rarely in complete heart block with established idioventricular rhythm. It lasts for a few seconds and the patient looks as if dead, i.e., he collapses and lies limp and pulseless, with pupils fixed and dilated and in slightly prolonged attacks there may be convulsions. Remember that the duration of attacks is a few seconds and if ventricular asystole continues for more than 2-3 minutes, recovery is unlikely. It is fortunate that these patients quite often come out of these attacks in a few seconds with resumption of ventricular beating and return of consciousness. Adrenaline ½ to 1 c.c. of 1:1000 solution should be immediately injected and this drug may have to be repeated fairly frequently to prevent the recurrence of attacks. If ventricular asystole is prolonged, adrenaline 0·1 to 0·5 c.c. should be injected intracardiac, though usually unsuccessful. Ephedrine gr. ⅓ is good for prevention but not as good as adrenaline. Adrenaline in oil (2 mg. in 1 c.c.) may be used to reduce the frequency of injections.

Vasomotor: Vasomotor syncope is the common simple psychogenic faint which is precipitated by fright, pain, severe emotional disturbance, sight of blood, etc. Premonitory symptoms such as nausea, sweating or light-headedness usually precede the attack, which occurs only if the patient is standing. The emotional disturbance gives rise to a powerful autonomic discharge, sudden depression of vasomotor centres along with cholinergic manifestations giving rise to gross vasodilatation in muscles and splanchnic bed, but not in the skin which is pale and cold, with collapse of peripheral resistance and rapid fall of B.P. which ultimately brings about inadequate cerebral blood flow and loss of consciousness. The best measure is to lay the patient down with his head lower than the feet and, if at all necessary, inject adrenaline, atropine, etc. Reassurance after the patient regains consciousness is important in consolidating recovery, and the patient should be told that there is no danger to life in such attacks, and if at all it recurs, it should be warded off by lying down when warning symptoms appear.

Carotid Sinus: Syncope is brought about either by reflex cardiac standstill or gross fall of B.P. The diagnostic criteria are: (1) No premonitory signs; (2) Attacks are reproducible by carotid sinus stimulation; (3) Attacks should not occur after the administration of adequate doses of atropine or ephedrine, i.e., doses large enough to prevent the bradycardia on manual carotid sinus stimulation. The patient should be tested when recumbent and pressure should not last more than

a few seconds. The causes are hypersensitivity of carotid sinus or a mass pressing upon carotid sinus. In resistant cases excision of sinus nerves—denervation of carotid sinus has been carried out with success.

HYSTERICAL: Hyperventilation — hysterical dyspnoea—brings about CO_2 washout (CO_2 helps to maintain an adequate degree of cerebral vasodilatation) which gives rise to cerebral vasoconstriction and dizziness. Absence of premonitory symptoms, no change in B.P. or pulse, unconsciousness for varying periods from a few seconds to hours and other associated hysterical manifestations, give a clue to diagnosis. The treatment is psychiatric.

TACHYCARDIAS

AURICULAR FIBRILLATION: It is mitral stenosis. Supervention of auricular fibrillation gives rise to marked tachycardia associated with signs of pulmonary congestion or even oedema; the best treatment in such a situation is immediate I.V. digitalisation.

PAROXYSMAL TACHYCARDIA: Palpitation is the commonest complaint, but patients may complain of precordial pain, syncope, vertigo or they may be in a state of shock or cardiac failure.

Supraventricular paroxysmal tachycardia—It is not uncommon. As this is met with in patients having no organic heart disease and as the patients often come in between the attacks of palpitation, not infrequently they are diagnosed and missed as neurotic tachycardia or flatulent dyspepsia responsible for palpitation. During an attack, the cardiac rate, pulse rate, onsets, offsets and B.P. should be noted. Cardiac rate of more than 160 and commonly round about 180 to 200 which is totally regular with equal intensity of heart sounds, sudden onset and sudden termination of an attack in a young patient without an organic heart disease, is more often supraventricular paroxysmal tachycardia. ECG should always be taken at least once during an attack of tachycardia. It not only decides the diagnosis of paroxysmal tachycardia but also its variety. Though supraventricular paroxysmal tachycardia is a functional disorder commonly met with in normal hearts, it does not mean that this type of tachycardia may not be a complication of organic heart disease like mitral, congenital or coronary heart disease. Treatment in order of preference during an attack is carotid sinus stimulation or ocular pressure 1st on the right, then on the left side, but never simultaneously on both sides, lest it may give cardiac standstill and death, prostigmine ½ to 1 mg., procainamide hydrochloride I.M. (0·5 to 1 g.), digitalis I.V. and quinidine orally. Carotid sinus stimulation may be effective after administration of prostigmine or digitalis where it was initially ineffective.

Ventricular Paroxysmal Tachycardia—It is usually superimposed over an organic heart disease, especially following recent myocardial infarction. Being superimposed on a diseased heart, it brings about rapid cardiac failure. Immediate administration of quinidine or procainamide hydrochloride is indicated. Quinidine should be preferably given orally, dose gr. 6, 2 hourly till 5 to 6 doses, or less if conversion to normal rhythm occurs earlier. After conversion to normal rhythm, maintenance dose of gr. 4½ 4 times a day, reducing and increasing by trial and error till the minimum necessary dose is found to prevent ventricular paroxysmal tachycardia. Quinidine may be given I.M. if a patient is in a shock state or congestive cardiac failure. Procainamide hydrochloride is another good drug very useful in the treatment of this disorder. It should be given I.M. 0·5 to 1 g. which may be repeated after 1 to 2 hours if it has not restored to normal the sinus rhythm. Intravenous administration should be avoided in view of its hypotensive effect, except in an occasional case when very rapid effect is desired, and then also very slowly 100 mg. within 2 to 3 minutes, and not more than 1 g. and that too under ECG control. Procainamide hydrochloride orally 0·25 to 0·5 g. four times a day should be given to prevent recurrence of paroxysmal tachycardia.

AURICULAR FLUTTER: It is very rare and digitalis is the drug of choice for emergency treatment.

OTHER CONDITIONS

PULMONARY EMBOLISM: The common clinical conditions in which pulmonary embolism occurs are phlebothrombosis of deep leg veins in chronic congestive cardiac failure, postoperative especially following abdominal operations, and occasionally in myocardial infarct with septal involvement from mural thrombus on the right wall of the septum. A number of sudden or rapid deaths due to pulmonary embolism in patients suffering from chronic congestive cardiac failure, especially following mitral stenosis with or without auricular fibrillation, can be prevented by routine anticoagulant treatment till the patient improves from congestive cardiac failure. The symptoms may be mild or overwhelming, consisting of acute dyspnoea, pain, shock, cyanosis, restlessness and sweating. Pain may be substernal or on the side of the chest. Pain may not be a prominent feature or even may be absent, and dyspnoea with restlessness may be out of proportion to the clinical signs in the lungs. Other symptoms and signs are haemoptysis, fever,

pleural rub or signs of localised consolidation and signs of phlebothrombosis in leg veins in the form of swelling, tenderness and pain on flexion of the foot. Tachycardia, up to 140 to 150 per minute is quite common and makes one think whether it is not some rhythmic disorder which may be responsible for dyspnoea and other acute symptoms and may mislead one. ECG in a few cases gives supporting evidence in the form of right ventricular dilatation and strain pattern or may show a pattern of acute coronary insufficiency.

Treatment—Morphia or pethidine to allay restlessness, atropine to reduce vagal effect which brings about vasoconstriction of pulmonary and coronary vessels, oxygen in high concentration to counteract anoxaemia and the most important of all, immediate anticoagulant treatment in the form of heparin I.V. 10,000 to 15,000 units, repeated 6 hourly for the first 24 hours, and at the same time dicoumarol or tromexan orally, under clotting and prothrombin time controls.

HYPERTENSIVE ENCEPHALOPATHY: The symptoms mainly depend upon cerebral oedema and angiospasm, giving rise to increased intracranial tension and cerebral ischaemia. There may be prodromal symptoms in the form of severe and constant headache, nausea, vomiting and increased apathy or somnolence. Pallor of the skin prior to the attack is striking. Following these prodromes or suddenly without warning, the patient gets convulsions and becomes unconscious. Transitory paralysis, aphasia or amaurosis may occur from which the patient recovers without residual defects. There is always marked or extreme hypertension.

Treatment—Effective antihypertensive drugs have brought about an important change in the outlook and treatment of hypertensive crises. Hexamethonium bromide should be immediately injected to lower the blood pressure. They may be given initially intravenously and subsequently intramuscularly at frequent intervals about 3 to 4 times a day. A close watch on blood pressure level is essential, lest marked hypotension, with resultant danger of vascular complications like cerebral or coronary thrombosis, may occur. The second most important measure is venesection, letting out about 400 to 500 c.c. of blood. This quickly brings about amelioration of symptoms, notably convulsions. Other measures like mag. sulph. injections, hypertonic sucrose or glucose and lumbar puncture are sometimes useful, but they are no comparison to the above. Injectable bartiturates are useful in controlling convulsions.

PERIPHERAL EMBOLISM: This is characterised by acute and excruciating pain, blanching of affected area, coldness of extremities, absence of arterial pulsations, loss of sensations and eventually gangrene.

Opiates to relieve pain, anticoagulants to prevent enlargement of the embolus by local thrombosis, antispasmodics like papaverine, etc., and paravertebral sympathetic block to promote the collateral circulation and relieve associated arterial spasm are the medical measures to be employed; but embolectomy is the most important single measure and no time should be lost, as the operation is likely to be successful only if performed within twelve hours of the occurrence of embolism.

SPECIAL ARTICLE

REPLACEMENT FLUID THERAPY —RECENT TRENDS

MIRLE PUTTAIYA, B.SC., M.B.B.S.,

District Medical Officer,
Chickmagalur P.O., Mysore State.

An increasing knowledge of the chemical composition of body fluids during recent years has brought with it a greater awareness of the importance of restoring normal water and electrolyte balance in the body of persons who are suffering from the effects of their loss as a result of disease or as a postoperative complication. The use of the flame photometer for rapid and reliable estimation of Na^+ and K^+ concentrations in the body fluids have made practical the rational replacement of water and electrolytes in states of depletion.

Basic physiological considerations—Clinical state of dehydration, may result from loss of water or water and electrolytes from the body. The body is composed of two major compartments in which are lodged the body fluids. These are the intracellular and the extracellular compartments. The extracellular compartment is subdivided into the interstitial and the intravascular portions. The body attempts to maintain a state of equilibrium in the composition of its structures both solutes and fluid. It involves among other things the shifting of body water between the intracellular, interstitial and intravascular compartments. This may result in alterations in the concentrations of the numerous solutes.

Body water is derived either exogenously by ingestion or endogenously from oxidation, the latter amounting to about 350 c.c. daily. Excretion of water constantly occurs through the skin, lungs, gastrointestinal tract and kidneys. Besides these organs hypothalamus, pituitary and adrenals are

active in the control of body water levels. Though so many organs are concerned in the metabolism of water, the kidney is the most important organ in the maintenance of both salt and water balance, and the pH value of blood. A man weighing 11 stones contains 40 to 50 litres of water and 175 g. of NaCl. The water is distributed in the three compartments referred to i.e., intracellular, interstitial and intravascular in the following proportions respectively i.e., 40 to 50 per cent of body weight or 35 litres in the first, 12 to 18 per cent or 11 litres in the second and 4 to 5 per cent or 3 litres in the third. Sodium on the other hand is distributed as follows, ⅔ in the extracellular fluids and ⅓ in the rest of the body as alimentary secretion, sweat, urine and in muscles and bones. Very little is found in the cells.

The composition of the interstitial and intravascular fluids is identical except that the latter contains proteins. There is a very small difference in the electrolytic concentration between plasma and interstitial fluid, due to the so-called Gibbs-Donnen effect, which does not influence treatment. The conception of the continuity of the extracellular fluid is vital to the understanding of this subject. It must also be remembered that there is a constant to and fro filtration of fluid between the intravascular and interstitial compartments. The hydrostatic pressure at the arterial end of the capillary causes ejection of fluid and the osmotic pressure exerted by the plasma protein causes an indrawing of an equal volume of fluid at the venous end. The volume of the oscillating filtrate is of the order of hundreds of litres daily. This to and fro movement of fluids between the intravascular and interstitial compartments facilitates exchange of substances and also ensures a constancy of environment for the cells. The compositions of the intracellular (I.C.F.) and the extracellular (E.C.F.) are different. The E.C.F. has "Na" for its chief kation and "Cl" for its principal anion with the ions of K, Ca, Mg, HCO_3, HPO_4, SO_4 relegated to a second place, the I.C.F. has "K" with "protein" and "HPO_4" as the principal kations and anions respectively while "Mg", "HCO_3" and "SO_4" are secondary in importance. The distribution of water between cellular and tissue fluids is determined by their relative osmotic pressures. The cell membranes are freely permeable to water and any osmotic imbalance between the cellular and tissue fluids results in either water being sucked out or forced into the cells. The capillary membrane is also permeable to water and electrolytes of the E.C.F. but confines the protein molecules within the vascular compartment. The cell membrane is relatively impermeable to the chief electrolyte ions—a conception which is now questioned. 'Ion' movements must be such as to maintain 'electrical neutrality' as well as 'osmotic equilibrium'. There can therefore be no redistribution of negatively charged 'anions' without a corresponding redistribution of the positively charged 'kations', for example, the plasma contains more proteins and so more anions when compared with the interstitial fluid and so contains an extra amount of kations i.e., Na, K and Mg to neutralise the anions.

Physiological concepts of dehydration—Dehydration though literally meaning loss of water from the body biologically means loss of electrolytes in addition to water as when it is used in connection with loss of water secondary to depletion of electrolytes. Dehydration is called primary when there is inadequate exogenous supply of water. It is termed secondary dehydration when there is diminished intake of salt or abnormal loss in sweat, or through alimentary secretions as in vomiting or diarrhoea or discharge from fistulae or postoperative gastric lavage. In primary dehydration it is simply a loss of intracellular water whereas in secondary dehydration the volume of E.C.F. drops because kidney excretes water in the attempt to maintain extracellular isotonicity. The reduction of fluid in the intravascular and interstitial compartments is equal in primary dehydration and unequal in secondary type being greater in the tissue fluids than in plasma.

Even as recently as 1947 the degree of dehydration was expressed in terms of the departure from normal of the concentrations of NaCl in blood and urine and tests like Fantus's or its modifications were devised for assessing the NaCl deficit and therapy instituted in terms of this deficit. This procedure would be accurate only as long as the loss of N^+ kept parallel with that of Cl^- and the decrease in NaCl concentration in urine reflected a simple relationship to that of the blood. This state of affairs would happen in conditions like heat effects of the tropics or the dehydration of fevers where the composition of fluid lost i.e., sweat, was merely water and salt and replacement with parenteral saline would be rational. But when Na^+ or Cl^- ions were in excess of each other in the fluid lost as in vomiting or diarrhoea kidney would adopt differential excretion of N^+ and Cl^- in its attempt to conserve Na^+ and correct the acid-base upset that would result from the loss of body fluids and so estimation of the concentrations of NaCl in blood or urine would not give an accurate idea of the electrolyte Na^+ loss. It will be seen that N^+ comprises 93 per cent of the kations and 50 per cent of the ionic concentration of plasma and so of E.C.F. Therefore Na^+ concentration of the plasma is the key to the diag-

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nosis of disordered ionic structure of the E.C.F. and so to rational replacement or maintenance therapy. Another important reason as to why Na^+ should be considered as the most important electrolyte is that there is no substitute for this whereas any lack of Cl^- can be replaced by HCO_3^- ions which are always freely available from tissue metabolism. Knowledge of plasma or urinary chloride hardly gives any valuable information as to the osmotic status of a patient's E.C.F. and accent has shifted during recent years from estimation of blood and urinary chlorides to estimation of N^+ and K^+ concentrations in blood and urine and sometimes of the CO_2 combining power of the plasma and concentrations of protein in plasma and urine.

Estimation of deficit—It is necessary first to estimate the deficit of the electrolytes Na^+ and K^+ and sometimes of HCO_3^- and Cl^- and then choose a suitable solution to effect replacement. To do this it is more advantageous to express the electrolyte concentrations of blood and urine in terms of "milli-equivalent-per-litre" rather than as "milligrammes per 100 c.c." as this procedure gives an idea of the ionic concentration of the solution as well as its pH state.

An ideal method to calculate the deficit would be to collect all fluids discharged out of the body for 24 hours such as the vomit, motions, and urine, and estimate the amount of water and electrolytes particularly $Na,^+$ K^+ and Cl^- lost and add on to it 800 to 1000 c.c. of water to make up for the insensible loss of water through perspiration and respiration and make good this loss by a "tailor-made" solution. But this is next to impossible and so indirect methods of estimation of the deficit shall have to be adopted.

The indirect method is based upon the recognition of the following facts. First dehydration essentially affects the E.C.F. if it is presumed that pure water depletion is rare and the common condition which occurs is mixed depletion of water and electrolytes. Na^+ ion forming as it does 93 per cent of the kations 50 per cent of the ionic concentration of plasma is the key to the disordered ionic structure of the E.C.F. and estimation of Na^+ deficit in the blood gives a reliable approximate of the amount of electrolyte depletion. Whenever possible it is paying to estimate Cl^-, K^+ and HCO_3^- concentrations. Blood urea estimation and determination of plasma protein level are often necessary though not so very essential as the estimation of serum Na^+ and K^+ concentrations. Since Na^+ is mostly in the E.C.F., Na^+ deficit is equal to fall in serum Na^+ level multiplied by E.C.F. volume. The effective volume of distribution of injected N^+ approximates the total body water rather than the E.C.F. (Black, 1953). Assuming 40 litres as the volume of total body water in a man weighing 154 lbs. or 70 kg. and 140 m Eq/l as the normal serum Na level then the amount of Na deficit $= \frac{(140 - Na) \times 40}{140}$ as isotonic saline in litres since isotonic saline also contains 140 m Eq/l of Na^+. It is necessary to remember here that mere presence of a low serum Na^+ does not indicate a condition of dehydration as conditions like "sodium paradox" (Moore, 1954) or "hypotonic syndromes" show a low serum Na^+ without a clinical state of dehydration. Having calculated the Na^+ requirements in the way outlined above, the water deficit could be determined by adding on 800 c.c. of water to make up for insensible loss through sweat and expiration to the measured amount of fluids lost through the body as vomit, urine, aspirated fluids and motions. All the data necessary for rational replacement therapy are now available. When it is not possible to determine Na^+ concentration the sum of Cl^- and HCO_3^- concentration gives a fair approximate of Na^+ concentration as these are the two main anions which neutralise the chief kation Na^+. The clinical assessment of Na^+ depletion is based not merely on the chemical analysis but also on the history as through what channel or channels body fluids are lost and examination of the patient for signs of dehydration and peripheral vascular failure. It has been found that if the serum Na^+ level is 125 m Eq/l and is associated with a physical state of dehydration there is definite Na^+ depletion which calls for immediate replacement therapy.

The next step in the problem is the choice of the replacement solution, the quantity to be administered and the rate and route of administration. The problem is very simple if it is a case of simple water depletion which is typically characterised by the protective phenomenon of thirst, absence of orthostatic fainting, normal plasma chloride and viscosity of blood and which needs merely supply of adequate water if it can be taken orally or as 5 per cent glucose solution if it can be given intravenously since glucose solution has no osmotic significance as it is very soon burnt up by the tissues. It is important to remember that administration of water or parenteral glucose is not such a harmless procedure as it appears to be at the first sight. It is possible to poison a patient with water when its administration is carried to excess as it will cause water intoxication, coma and death. The amount to be administered depends upon the degree of dehydration. If for some reason water cannot be administered by mouth it may be introduced by a rectal drip or by I.V.

injection. When it is decided to give intravenously a 5 per cent dextrose solution should be given as a drip at a rate not more than 40 drops and a quantity of not more than a litre every 4 hours to prevent the kidneys from being overloaded or the onset of pulmonary oedema. Mixed depletions of water and electrolytes as already mentioned are more common than pure water depletion.

In mixed depletions the choice of the solution depends upon the relative amounts of Na^+ and water deficits. The total Na^+ content in the E.C.F. in a person ordinarily weighing 154 lbs. is about 1800 to 3000 mEq/l where Na^+ concentration is 138 to 143 mEq/l. The degree of Na^+ depletion depends upon the channel through which the body fluid is lost. For among the various secretions such as sweat, gastric secretions, intestinal, biliary and pancreatic secretions, insensible sweat is practically water, sensible sweat a hypotonic saline, while bile and jejunal juice have almost the same composition as the tissue fluid and the gastric juice at one end and the ileal juice at the other have either Cl^- in excess of Na^+ or the reverse respectively. If the fluid lost is through sweat as in heat effects isotonic saline would be a suitable replacement fluid. But if the channel of loss is through vomit more Cl^- is lost than Na^+ leading to hypochloraemic alkalosis while if diarrhoea is the cause of fluid loss the reverse state of hypochloraemic acidosis results. Naturally replacement fluids shall have to be different from isotonic saline in these two extreme states. Hurwitz *et al* (1952) in U.S.A. have described two ready-prepared solutions G & D which provide volume for volume replacement of losses through suction or drainage, the one for losses such as would predominate in a patient with an obstructing duodenal lesion and the other for losses from the small intestine as in ileostomy.

The composition of solution G for replacement of gastric fluid losses is as follows:

	G./litre	or	mEq/l
Sodium chloride ...	37		63
Potassium chloride ...	13		17
Ammonium chloride ...	37·4		70
Dextrose U.S.P. ...	100		Nil

The composition of solution D for replacement of duodenal fluid losses is as follows:

	G./litre	or	mEq/l
Sodium chloride ...	51		88
Potassium chloride ...	9		12
Sodium lactate ...	56		50
Dextrose U.S.P. ...	100		Nil

These solutions should be given if only the kidneys are functioning normally. It will be seen that both solutions provide for some K^+ which is a very essential part of treatment in Na^+ depletion, a point which will be elaborated later. These infusions are to be administrated as a drip through polyethelene tube which permit the patients some movement and enable the tubes to be retained for a week or more by keeping them flushed every four hours with a few cubic centimeters of isotonic saline containing 5 mg. heparin.

In acute Na^+ depletion a Na^+ deficit of 500 mEq/l of Na^+ is found and this, according to Black (1953), could be corrected by giving 3 litres of N saline. The first litre of saline is given in one hour. This restores the kidneys to act selectively excreting a higher portion of Cl^- than Na^+. This amount of saline could be given without giving rise to acidosis. But if the Na^+ depletion is complicated by metabolic acidosis as in diabetic coma it is better to give one litre in three of 1/6th molar sodium lactate instead of N saline. In chronic Na^+ depletion very large quantities of NaCl shall have to be given which may cause acidosis. There will also be concomitant K^+ depletion, which may be intensified by massive Na^+ infusion. This type of depletion is found in prolonged loss of gastric, pancreatic or intestinal secretions. The Na^+ deficit in these individuals is of the order of 1000 mEq/l of Na^+ and above and loss of 8 to 9 litres in a few days is not uncommon in severe diarrhoea and paralytic ileus. In severely dehydrated person the total water and electrolyte depletion comes to about 12 litres of N-saline and 2 litres of 5 per cent glucose and this is a very large amount to be given daily. Black (1953) recommends the use of hypertonic saline of 5 to 10 per cent strength to replace the Na^+ deficit and to feed water by mouth to make good the water deficit and has quoted a number of cases where this procedure did not meet with any adverse effects. If the water deficit is greater than that of Na then N saline is given until chloride appears in the urine as the Na deficit should be made up as quickly as possible and then a 0·54 per cent saline with 2 per cent glucose is administered as a maintenance solution. In children when giving saline parenterally particular care should be taken to give a N/4 solution and that also not too long as their kidneys cannot execute freely NaCl. Care should be taken when giving hypotonic saline that overhydration is caused by administration of a quantity beyond the needs of the patient. Overhydration can be clinically recognised by oedema, renal impairment, paralytic ileus and even coma. In a difficult case the water balance can be assessed by weighing the patient since changes in weight over short periods almost entirely depend upon changes in body water con-

tent and water loss is equal to weight loss. Loss of 2 to 3 Kg. in a day therefore indicates a loss of 2000 to 3000 c.c. of water. The use of M/6 Na-lactate solution should be adopted in dehydration due to loss of upper small intestinal contents such as bile, pancreatic fluid and jejunal fluids as use of NaCl solution will aggravate the hyperchloraemic acidosis. M/6 Na-lactate should be used till the plasma bicarbonate level is near the lower limit. The requirement of M/6 Na-lactate solution is calculated by the following data. 42 c.c. of M/6 Na-lactate per Kg. body weight raises the plasma bi-carb by 1 mEq/l. M/6 Na-lactate solution is the solution of choice if plasma bi-carb level falls below 16 mEq/l (Merivale, 1953).

The following table gives the composition of some commonly used replacement solutions.

Name of solution	Na^+ mEq/l	K^+ mEq/l	Cl^- mEq/l	Lactate mEq/l
(i) Normal saline	154	Nil	154	Nil
(ii) 0·54 saline with 2 per cent glucose	92	Nil	92	Nil
(iii) M/6 Na-lactate	154	Nil	Nil	154
(iv) Hartmann's solution ..	123	5·4	109·5	20

besides which it has 2·5 m Eq/l of Ca^+.

K^+ depletion. Though Na^+ is the key to the ionic concentration of the E.C.F. and Na^+ depletion is about the commonest disorder, it has been shown that K^+ is essential for health and K^+ deficiency is frequently met with particularly in severely ill patients and in the immediate post-operative period. If the K concentration is below 3·0 mEq/l significant clinical and electracardiographic evidence of K^+ deficiency is present. Loss of gastrointestinal fluids accompanied by absent or low food intake contributes mostly to the low K^+ concentration. In postoperative cases three factors which invariably are followed by hypopotassaemia are loss of gastrointestinal fluids by suction, I.V. administration of fluids containing little or no K^+ and no oral intake of food. K^+ unlike Na^+ is not a threshold substance. Appreciable amounts of K^+ are excreted in the urine even when the plasma K^+ is low. However striking the clinical signs of deficiency may be their recognition chiefly depends upon the knowledge of circumstances under which hypopotassaemia occurs. Weakness, lassitude and lethargy with abdominal distension due to ileus are the common symptoms and there may be associated hypochloremic alkalosis and the E.C.G. curve is typical with flattening of T waves and prolongation of QT interval. Treatment is replacement of deficient electrolyte, oral administration has been reported to be the best since this practically eliminates the risk of K^+-toxicity. The dose given is 9 to 12 g. of KCl daily in divided doses and it has been found 30 mEq/l per day is usually adequate when for some reason oral replacement therapy is not possible. A patient with K^+ deficiency should be restored to normal water balance with proper fluids before K^+ is administered with usually a litre or two of NaCl and one or two days should be allowed to elapse for the renal function to be re-established, after operation, before administering K.

Summary

Dehydration is rather an ambiguous term and means not merely depletion of water but more often water and electrolytes. Na^+ forms major part of E.C.F. and controls the osmotic equilibrium between plasma and intestinal fluid. As Na^+ concentration is the key to the disordered ionic structure of E.C.F. it is necessary to estimate the Na^+ deficit for instituting rational replacement therapy. The practice of estimating the serum chloride or urinary chloride for determining the state of dehydration is not correct. To facilitate accurate determination of Na^+ deficit it is more advantageous to express the values in terms of mEq/l as with this method of expression not only a correct idea of the osmotic condition is obtained but also the pH state of the solution can be understood, which is important, as states of dehydration are usually associated with acid-base upset. Regarding treatment normal saline is advised in the initial stages till reappearance of chloride in urine, the quantity depending upon the weight lost and a 0·54 saline with 2 per cent dextrose as a maintenance therapy. The danger of overhydration with hypotonic saline therapy is stressed. In differential excretion of Na^+ and Cl^- with resulting hypochloremic acidosis or in severe acid-base upsets as in diabetic coma, Na^+ deficit is made up by giving M/6 Na-lactate solution and what quantity to be given is also indicated by a formula. In low Na^+ syndromes it has been shown how replacement therapy is not indicated in Na^+ paradox and contra-indicated in water intoxication. Hypopotassaemia, when it occurs and what symptoms are associated with it and method of treatment are briefly indicated.

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SPECIAL ARTICLE

PREVENTIVE MEDICINE AS A MAJOR FUNCTION OF THE HOSPITAL†

P. M. SANGANI,

Bombay.

Health protection means providing conditions for a normal mental and physical functioning of the human being. It includes promotion of health, the prevention of sickness. It is well recognised that health services far from constituting an isolated field of activity are intimately related to the social and economic problem.

The hospital and the health organisations are the organisations created to safeguard the community. As we consider the responsibilities of the health departments and the hospitals, we see that the health department is to protect the health of the individual and both the health department and the hospital have a profound interest in preventive medicine.

A hundred years ago and even to-day the health department was and is mainly concerned with the supervision of water, food supply and sewage disposal of a community. In short, it may be considered as the sum total of the factors, which combine to prevent the development of a disease and to avoid the recurrence of the disease in individuals who have recovered from it.

A hospital is a place where sick people can be examined and treated, cured and if necessary rehabilitated ; it is thus a centre for curative and rehabilitative medicine. Preventive medicine and hospital medicine appear at first sight, to have little in common. But this is far from true. In dealing with preventive medicine and the hospital we are in fact studying and defining the relationship which should exist between preventive and curative medicine. To-day we see, the health departments aggressively working for the control of the diseases. There has been a parallel development in hospital field. Not long ago, hospitals were considered pest houses where patients went to die. The hospitals were little more than ante rooms to the morgue, and few persons, once admitted, lived to leave. To-day the hospital has been miraculously converted. The modern hospital is a wonder to behold. To-day people enter a hospital to live and to bring back new life safely into the world.

†Read at the Eighth International Hospital Congress.

As we enumerate the functions of a health department, the responsibility of to-day's hospital in public health becomes fairly obvious. While health departments may still shoulder the responsibility for the health, and the hospitals continue to look after the ailing individual member ; both have more and more begun to look beyond the narrow confines.

The fact is that close co-relation between the preventive and curative elements of the health programme seems the only logical solution ; for the relationship between these two kinds of activities must vary according to the social and economic conditions, and may require different and changing emphasis. In rural areas, there is a tendency towards a combination of curative and preventive programme in a single unit, which leads to greater economy and higher efficiency. In densely populated community, on the other hand, there is a movement towards greater specialization and the separation. The working relationship of the two has become more intimate, which is as it should be. If the health department has to carry out its responsibilities in new fields, and if the hospital is to plan its needs for the future to care for increasing number of patients, the closest liaison is necessary.

The responsibility of the hospital exists for the education of the medical and para-medical personnel. Considerable emphasis must be placed on the need for the education of the patient and his family, while he is being treated in the hospital. It is a relatively unexplored area that merits increasing attention. It is necessary to face the fact, however much it is to be deplored, that the medicine of to-day is primarily curative in outlook and that few doctors are interested in the prevention of the disease.

By aiming at preventive tasks, in addition to curative ones, medicine has changed the function of the hospitals. The ultimate aim of the hospitals is no longer the treatment of the patients but rather the health and welfare of the citizens. We should then gradually reach the abolition of the hospitals as we know it. If we look back to last 50 years, we will notice the change that has taken place in patients requiring hospitalization. We have witnessed a substantial decrease of certain infectious and epidemic diseases which up to some time were widespread, such as plague, small-pox, cholera, which have now more or less completely disappeared. Endemic diseases such as typhoid fever, malaria are now reduced. Tuberculosis is regressing in all developed countries. On the other hand, patients suffering from heart diseases, cancer, nervous disorders and injuries resulting

from accidents are on the increase. Everywhere the demand for beds for patients suffering from complaints of old age is becoming greater.

The present incidence of disease with the massive and elaborate superstructure of medical care which it demands, is a shame upon modern civilization and a vote of censure on a responsible society.

The past history of medical education and practice shows the academic blunder of divorce of preventive from clinical medicine and its forced marriage to public health. This mistake has now much to answer for. Through it, generations of doctors have been trained in belief that the preventive medicine is inseparably linked with special hospital for infectious fevers and with the supervision of water supplies and food stuffs. In recent years a welcome effort has been made to bring the preventive ideal back into clinical medicine under the new name of Social Medicine. But there are signs that once again this too is becoming a speciality.

One of the major reasons for the importance attributed by public health specialist to preventive medicine in its relation to the hospital is the increasingly urgent problem of the building and maintenance costs of a modern hospital. These costs are to-day reaching astronomical figures and are increasing at an alarming rate. The best treatment carried out in the best hospital can only have very little influence on the disappearance of any particular disease. Finally in the richest and most developed countries, and all the more so in the most underdeveloped countries, it is quite impossible to treat all cases of illness in hospital by the most modern methods. This means that the function of the hospital must be not only to treat the patient but also to prevent recurrence of the disease. It must therefore be planned with a view to prevention as well as to treatment. The guiding principles of modern hospitals should be—

(*a*) Patient care, (*b*) Medical education, (*c*) Research, (*d*) Rehabilitation, and (*e*) Prevention.

Patient care—In actual fact, the first four basic functions of the hospital serve the purpose of preventive medicine ; the care of the patient and in particular the instructions, if at all he is given on returning home after his stay in the hospital, are designed not only to cure him but also to prevent the recurrence of his illness. The physician and surgeon are in fact attempting practising preventive medicine.

Medical education—This is a complex problem from the point of view of preventive medicine. It is essential to have an independent department of preventive and social medicine, responsible for initiating future doctors into problems which require the observation of the patient in his social and material surroundings. With this end in view the department of preventive and social medicine should use the area as laboratory for the study of health and sickness, applying the same rigorous standards as those governing the work of an analytical laboratory or a hospital ward.

Laboratory research—Research carried out in hospital laboratories, whether clinical or scientific also has a definite though indirect effect on prevention.

Rehabilitation—Rehabilitative medicine is closely linked with the preventive medicine, so that the patient is better able to resist recurrence of his illness and does not contract a new disease.

Prevention—Preventive medicine ought to have a more definite place in the hospital world and should serve various well defined purposes through—(*a*) Out-patient department. (*b*) Follow up service. (*c*) Health education of the patient and his family. (*d*) Hospital social services.

The out-patient department is playing an increasingly important part in the medical world of to-day. The hospital should have a particularly well equipped, well organised out-patient department. It serves as a link between the hospital and the general practitioner. It is the out-patient department, which indicates what action should be taken from the point of view of prevenuive or of social medicine. The up-to-date organisation of this department would certainly decrease hospital expenditure to a considerable extent by providing the best facilities for quick and accurate diagnosis. It should have such relations with the general practitioners that they are encouraged to participate in its work to learn from it the newer methods of early diagnosis and treatment and to feel that they can rely on its help to bring its services into the homes of their patients. Finally, they should send back practical information and suggestions about the techniques of patient care to hospital and here its voice should not be unheeded. To fulfil these duties, the hospital must ensure that at all times its own outlook, methods and facilities are flexible enough to allow continuous research and experiment into the improvement of the techniques of patient care. The doctor working in an out-patient department should not think his work is done when he has made a diagnosis and given treatment. He should keep in touch with the general practitioner, give him any indications he may require for the purpose of looking after the patient during the development of the disease and of avoiding its recurrence once

the patient has recovered. This follow up service which includes the patient's return after recovery, for periodical examinations is extremely important from the preventive point of view.

Many hospitals do not as yet possess these. It is not unusual to recognise the size and majesty of a hospital by the number of beds it contains, the capital—and even the maintenance costs are assessed at so much per bed, the personnel is determined as so many units per bed, and beds constitute the major service, sometimes almost the only one, which the hospital has to offer.

Patient's family must also be given direct instructions regarding the precautions to be taken. Beyond any doubt the hospitals of future should be planned from the preventive as well as curative point of view. This incidentally would be to the economic advantage. Preventible or curable diseases, disability and premature death represent a social 'waste' which is equivalent to crores of rupees. But it is difficult to make the authorities see that a programme of preventive medicine is in fact a profitable investment. Such a programme however, must be integrated into an economic programme.

Professor Winslow has rightly pointed out that poverty and disease form a vicious circle. People are sick because they are poor, they become poorer because they are sick and sicker because they are poorer. There is a cumulative process in operation, continuously pressing the levels down, where one negative factor is at the same time both cause and effect of all the other negative factors.

The general relationship between poverty and diseases is illustrated by all health indices. Thus the life expectancy at birth in a small part of the world which can be characterised as developed is much longer than in the much larger part of the world which is underdeveloped. In the underdeveloped countries, large sections, sometimes even the majority of the population are suffering from illness which are almost entirely stamped out in more fortunate countries.

It is a matter of grave uneasiness that in the recently so-called underdeveloped areas which include nearly two-thirds of the world population, the life expectancy was only 30 years, while in well developed countries it amounted to 63 years.

Economics of Sickness

What is the quantitative effect of sickness on national economy and what burden of sickness can a nation tolerate economically. There is at present no real answer to these questions, for importance of cost of hospitalizations has obscured the importance of the wider issues; and though there are frequent demands from the finance side for reduction in the cost of the service to the sick; there is not much real knowledge as to whether these enforced savings are in the long view true economics or false ones.

Hospital figures often show with satisfaction that so many people are being ill and that so many beds are kept so full, yet surely the proper aim of medical care should be to eliminate the hospital as we know it to-day. This social failure should be noted with grave anxiety rather than a success hailed with acclamation.

Briefly the economic impact of sickness upon national productivity is immense, I would also call to your symphathetic minds the burden of suffering which all this sickness entails to the patients and to those who care about them. It is easy enough perhaps too easy to say that a man or woman must be admitted to hospital; it is easier still to forget or perhaps never to realise what this sentence may mean to the patient in terms of the dislocation of his homelife, of fears for his dependents, of fears of the hospital and what may happen to him in it, of fears of loss of employment. A serious effort might be made not to bring patients into hospital for comparatively trivial reasons, for there is still room for a greater degree of co-operation between the hospital and the practitioners outside it, to the end that the services of the hospital can be brought more freely into the home.

Hospitals have been working too long on a mechanical day to day programme of admission, treatment and discharge. The hospital should be a centre of education in a wider sense than that of the technological instruction of medical students and nurses. It must disseminate its knowledge freely. It should see how best it can teach the people who come within the influence, the simple rules of healthy living if need be, it should press the local and even the central authorities for measures to improve the conditions of life of the people where these are seen to be defective.

Beds	Year 1951	Year 1956	Increase in 5 years
Total No. of beds in our country ...	1,06,478	1,17,222	100%
Total No. of Hospitals ...	2,014	2,062	2:4

We have 1 bed for 3,155 persons of population or 0·32 bed per thousand as against 4·7 beds per thousand in U.K. and U.S.A. To reach required number of beds we will need about 138 years at the present rate, if we ignore increase in birth.

It would seem wiser that to recognise that beds on this scale are unattainable and to admit frankly that our traditional system of medical care is deficient in its primary equipment.

It may well be that this country is not alone in facing this rather grim picture of the impact of economic pressure upon the traditional system of medical care; there is perhaps no country which has sufficient beds to meet the real need of its population. The mechanical building of beds in increasing number for all time is not the real answer to the problem of the control and diminution of sickness and it may well be that sooner or later some radical revision of the current system of medical care, in outlook and in techniques, will become inevitable.

One great weakness in the present system of medical care is that it rests with the patient to make the first gross diagnosis of his illness. This is the barrier which will somehow have to be surmounted in the medicine of to-morrow. Much might be done by popular education in which the hospital must play the part; a beginning has perhaps already been made along the right lines in mass radiography, in the local health services of schools and universities, factories and among transport workers.

Conclusions

Medical profession would need to know much more about health than it does at present.

As an immediate step a programme might be devised to realise the importance of out-patients' department to a level more comparable with the services accorded to in-patients, and some principle might be accepted to the effect that all general hospitals of 100 beds or more should offer most up-to-date out-patients' services. The aim of the service would be directed to keep the patients out of the hospital beds as far as possible, in contact with their home life and even their normal occupations. Such a service can only be attempted if the facilities for it are adequate both in area and in equipment. I do not believe that in these days any out-patient service can function properly unless it has direct and immediate linkage with the ancillary services of radio-diagnosis and pathology.

Curative medical practice has been revolutionised, and its advance has been at a truly remarkable speed. It may be that in the excitement there has been too great an obsession with the search for curative panaceas and too much entrailment with the skills and techniques of the cruder reparative procedures, in comparison with which the unchartered field of the prevention of disease has seemed dull and uninspiring. But the skills of patching of the sick are one part of the total responsibility which rests upon society for good health and well being of its members and the full investigation of the potentialities of preventive medicine, applied not to the mass only, but to the individual cannot be avoided indefinitely without serious risk.

Let there be a starting point of a renaissance of medical thought and experiment from which benefits may go to mankind greater even than those derived from discoveries of the last century. Good old saying "Prevention is better than Cure" still holds good.

CASE NOTES

A CASE OF ACUTE CHLORPROMAZINE HYDROCHLORIDE POISONING

G. B. SINHA, M.B., M.R.C.P. (EDIN. & LOND.)

AND

S. K. MITRA, B.SC., M.B.B.S. (CAL.),

Department of Medicine, Medical College Hospitals, Calcutta.

A case of acute chlorpromazine hydrochloride poisoning is reported here as to our knowledge no such case has yet been reported in medical literature.

Case Report

The patient, Miss S. S. G., aged 27 years, was admitted in the Medical College Hospitals at 12-50 A.M. on 31-12-1954. Her relatives gave the history that she took 30 (thirty) tablets of chlorpromazine hydrochloride at 7-30 P.M. same evening. They further gave the information that the patient was suffering from chronic depressive psychosis and was being treated by electric shock-therapy for the last 4 months during which she was taking one tablet of chlorpromazine hydrochloride per day on the advice of her attending physician.

On examination immediately after admission the patient was found unconscious. Pupils—pinpoint, not reacting to light nor to accommodation. Temperature 96°F; Pulse—128 per minute, of low volume and tension; Respiration 20 per minute, shallow. Extremities were cold and had a cyanotic hue. All tendon jerks were absent. Abdominal and plantar reflexes were absent. Blood pressure was 90/55 mm. of Hg.

She was treated as follows:

(1) Stomach wash was given with plain warm water once only immediately on admission.
(2) Foot-end of the bed was raised.

(3) Patient was kept warm by blankets and hot water bags.
(4) Methedrine sulphate 30 mg. was injected I.M. and repeated 8 hourly (3 doses only).
(5) Strychnine hydrochlor gr. 1/60 hypo. 6 hourly (4 doses).
(6) Penicillin was administered as a prophylactic against pneumonia.

Patient responded very well and rapidly, on this line of treatment. On the following morning, she was conscious, answering questions to the point. Pupils—normal. Temperature—98°F. Pulse —84 per minute. Respiration—normal in rate and depth. B.P.—110/70 mm. of Hg.

She made an uneventful recovery from the effects of poisoning.

Diet consisted of hot milk drinks only for 36 hours.

Discussion

Chlorpromazine hydrochloride is a new synthetic phenothiazine derivative. Chemically it is closely related to the anti-parkinsonism, anti-histaminic and anti-emetic drugs. It has marked pharmacological activity on both the autonomic and central nervous systems, with a powerful peripheral anti-adrenaline action. It depresses the vomiting and heat-regulating centres. It has very little anti-histaminic activity. It is reported that it enhances the effects of central depressants like hypnotics, analgesics and anaesthetics.

According to the published literature of the manufacturers, the clinical possibilities are—

(1) use as anti-emetic—pre-operative and post-operative.
(2) alternative form of pre-medication in anaesthesia.
(3) to enhance and prolong the action of analgesics.
(4) for treatment of intractable nausea and vomiting.
(5) for treatment and management of mild psychoneurosis.
(6) for treatment and management of severe hyperpyrexia.

Recommended oral dose by the makers is 75-300 mg. per day divided into 3 doses. Our patients took 30 tablets (30×25 mg.=750 mg.) in a single dose.

As no case of acute poisoning has been reported yet, the signs of acute 'poisoning' based on animal studies, as listed in the literature, tally with the signs and symptoms shown by this (human) case. The signs and symptoms are due to: (1) Acute hypotension, (2) Profound central nervous depression, and (3) Marked hypothermia.

The result of the treatment as followed by us was good.

Acknowledgment

We are grateful to Dr. M. N. Sarkar, the Principal-cum-Superintendent, Medical College Hospitals, Calcutta for permission to report the case.

A CASE OF UNUSUAL FOREIGN BODY IN THE URINARY BLADDER IN A MALE

MANUBHAI D. PATEL, M.S. (BOMB.),
Asst. Hony. Surgeon, S. S. G. Hospital, Boroda.

Many types of foreign bodies have found their way up the female urethra into the bladder. Comparatively fewer cases of this type have been recorded in males. The recorded foreign bodies in both sexes include broken off catheters and bougies, chrochet hooks, sewing needles, slate pencils, lead pencils, straws, feathers, boot laces, strings, chewing gum, wax, tallow etc.

The following is the case report of a male patient from whose bladder a neem (margosa) twig encrusted with phosphatic concretions was removed.

Case Report

V. P., an unmarried male aged 20, a farmer, was admitted with the following complaints which started about a month back.

(1) Burning sensation during micturition.
(2) Passage of pus and blood per urethra.
(3) Frequency of micturition. In between the act of micturition some dribbling continued and soiled clothes.

Physical examination showed extremely tender prostate. X-ray of the bladder revealed a pear-shaped opacity in the bladder region, the density was not so well marked.

The patient was operated under spinal anesthesia. To begin with sounding of the bladder was done which revealed the presence of the stone. On entering the bladder *via* suprapubic incision it was found that there was a marked degree of cystitis and practically the whole of the bladder was occupied by an irregular mass of concretions which gave way as the finger tried to hook it out. An irregularly twisted twig about 18 cm. in length and about 2 mm. in diameter, covered irregularly by phosphatic encrustations was hooked out. Patient was immediately questioned about it.

He revealed the following story:

Patient had some burning and difficulty in micturition for which he sought advice of a friend of his in the village who was treated in a hospital some months back for similar complaints. His friend told him that he was cured after the doctor had passed a "metal rod" up his urethra (? Dilatation with metal bougies) and cleaned it. Between them they drew up an analogy between this cleaning and cleaning of inside of empty bottles. A neem twig was prepared for the purpose and introduced by the patient himself. But its lower end got lost up the urethra and so he milked it up the bladder. Symptoms started next day.

The patient made an uneventful recovery later on.

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NON-BREATHING NEONATES

A very large number of babies die every year due to failure in establishment and continuance of normal respiration. Attempts are of course made to resuscitate the asphyxiated baby, in accordance with the facilities available. All are happy if the baby is revived, but the whole incident is often soon forgotten, if it fails to be. It appears that sufficient attention has not been focussed on this common aspect of huge foetal losses, in contrast to the great deal of measures undertaken to ensure safety to the expectant and parturient mother. Through strenuous efforts of all concerned it has been possible, since the turn of this century and specially during the last few decades, to steadily reduce maternal mortality and morbidity. The foetus and the newborn baby do not however seem to have received much attention. For although (in the U.S.A.[1]) the combined mortality for foetuses and for infants of less than four weeks' age, has fallen from 79·1 per 1,000 live births in 1922 to 43·4 in 1950 ; there has been practically no reduction, however, during the past 40 years in the death rate on the first day of the baby's life, which makes up for more than one-third of all infant deaths[2], the present general neonatal mortality in U.S.A. being estimated at between 19 to 20 per 1,000 live births[3]. It has been further estimated[2] that in Chicago in 1952, the first hour of life took a toll of 27·2 per cent of the deaths occurring within the first eight hours of life, while the toll of the first eight hours represented 66·5 per cent of the deaths of the first day.

It is thus evident that the period just before and just after birth is a very critical time for the baby, many dying from anoxia or abnormal pulmonary ventilation, during or soon after birth. Inside the uterus the foetus exists in an oxygen atmosphere of approximately 50 per cent[4]. The oxygen supply to the human foetus in a clinically normal pregnancy has been found[5] to fall gradually up to the 40th week of pregnancy when most foetuses are well oxygenated with nearly 100 per cent reserve. A moderate deficiency of oxygen over a short period of time has been found[6] likely to seriously injure the foetus. Provided the circulation is intact, the human foetus near term may survive a total lack of oxygen for up to 30 minutes. Normally there is rapid upward adjustment of the infant's blood oxygen saturation from approximately 50 per cent to adult levels of about 95 to 96 per cent, occurring within 15 minutes after delivery. If these adjustments are not made quickly the baby is not likely to survive. Hence the first 15 minutes are the most important in the whole life span of an individual. The well-oxygenated baby can stand the effects of labour of any kind without suffering from lack of oxygen, but a foetus already with a deficient supply is likely to experience serious deficiency of oxygen during labour. This deficiency is evidenced by the passage of meconium, when oxygen saturation of the blood in the umbilical vein has been found[6] to be at or below 30 per cent. Several workers[4, 7] have drawn attention to the fact that a fall of the maternal blood pressure below 80 mm. of mercury and its remaining there for five minutes or longer, and also the duration of anaesthesia longer than 10 to 12 minutes, may cause serious foetal anoxia. A difficult or prolonged labour, where sedatives or anaesthetics have been used on the mother, as also maternal ailments like cardiac diseases and failure, anaemia, pulmonary disease, infections, genito-urinary and gastro-intestinal diseases, metabolic diseases and toxaemias of pregnancy, are all likely to bring about deficient oxygen supply to the foetus as also depression of the respiratory centre.

Besides failure of central stimulation from anoxia and other causes operating before birth, a baby may also fail to breathe properly because of low oxygen tension in the inspired air, obstructed airway, and abnormal pulmonary ventilation due to atelectasis, pulmonary emphysema, oedema and pneumonia. Attention has recently been drawn to intrauterine and neonatal pneumonia[8], as accounting for approximately 10 per cent of all deaths in this age group, and hence deserving further studies. The authors have found most of these pneumonias to be diffuse, bilateral and of a type with great predominance of polymorphonuclear leucocytes, with the highest incidence in premature infants with early rupture of membranes. Asphyxia of the newborn often occurs as a result of aspiration into the air passages, of liquor amnii, meconium and such other swallowed contents of the stomach which have subsequently regurgitated

[1] *J.A.M.A.*, **156** : 1471, 1954.
[2] *J.A.M.A.*, **153** : 466, 1953.
[3] *J.A.M.A.*, **153** : 473, 1953.
[4] *J.A.M.A.*, **156** : 1481, 1954.
[5] *J. Obst. & Gynec. Brit. Emp.*, **61** : 162, 1954.
[6] *Am. J. Dis. Child.*, **80** : 34, 1950.
[7] *Am. J. Obst. & Gynec.*, **61** : 840, 1951.
[8] *Am. J. Obst. & Gynec.*, **69** : 147, 1953.

out. A few workers[9, 10] have demonstrated that respiratory excursions begin before birth, as a result of which amniotic fluid passes in and out of the lungs. "Hyaline membrane", another cause of foetal and neonatal asphyxia and death, perhaps first described by Johnson and Meyer[11] in 1925, has been the subject of several studies in recent years. This hyaline-like, homogeneous membranous structure, staining pink to red with haematoxylin-eosin dye, is usually found lining the alveoli, alveolar ducts and bronchioles; specially in premature babies dying of asphyxia. While some workers[12] accuse for this massive aspiration of liquor amnii *in utero*, the considered opinion of others[13] appears to be more probable that foetal anoxia during labour with consequent capillary endothelial damage, followed by high oxygen concentration therapy after labour may be very important in the causation of these hyaline-like membranes.

The treatment of babies born with asphyxia is usually carried out with a threefold attack. The first duty, of course, is to clear the air passages by suitable means and then to take immediate measures to prevent further pulmonary disturbances. The baby should receive oxygen within the first eight minutes in order to avoid irreparable damage. A clear airway can be well maintained with a soft woven and not too large endotracheal catheter. Liberal supply of oxygen must be given, intermittent positive pressure for which has been advocated[14]. Besides the pulmonary alveoli, oxygen appears to be utilised and beneficial if introduced into the gastro-intestinal tract[14]. Encouraging results have been obtained[15, 16, 17] by introducing two No. 10 Nelaton catheters into the stomach, with oxygen flowing into one at the rate of 2 to 4 litres per minute with an atmosphere of not over 60 per cent of oxygen—the second catheter acting as the outflow. A powerful stream of oxygen directed to the upper lip, with a narrow rubber catheter within a funnel, has been advised[18] as a much simpler method and reported to be of benefit in many instances. To prevent aspiration into the lungs of mucus, amniotic fluid and other foreign materials lying in the throat and trachea, and also to facilitate quick removal from the mouth the head of the infant should be kept in a dependent position, an inclination of 15° to 30° is perhaps optimal. Various mechanical devices have been invented and advocated at different times, with some benefit in suitable hands. A positive pressure air-lock apparatus devised by Bloxsom has been well reported upon[19, 20, 21], but is obviously not suitable for extensive use, wherever asphyxiated babies have to be cared for. Besides carrying oxygen to the asphyxiated baby's absorbing (pulmonary and gastro-intestinal mucous) surfaces, the infant must be kept warm, wrapped in a blanket rather than immersed in water.

Drugs like *a*-lobeline have been used to stimulate the depressed respiratory centre. A drug, N-allyl-normorphine, first prepared[22] in 1941, is nowadays being increasingly used with very encouraging results, and is likely soon to come in for more extensive use.

This naturally makes us think of the likely depressant and anoxic effect, on the infant, of various analgesics and anaesthetics used to relieve the mother. While most of them cross the placental barrier, it is reassuring to the attendants in labour that pethidine hydrochloride[23] and self-administered trichlorethylene[4] analgesia, two of the most commonly used preparations, usually do not compromise the oxygen saturation of the foetus during labour.

Not only do many asphyxiated babies fail to survive, but even those that are resuscitated, are sometimes liable to suffer from permanent intracranial damages, often leading to many so-called degenerative diseases, bringing about crippling disabilities throughout life.

The remedy of this huge wastage of human lives, obviously lies mostly in prevention which should begin even during antenatal care. Every childbirth must be carefully supervised, specially in premature or prolonged labour and also where the membranes rupture early. A liberal supply of oxygen to the mother, in cases where foetal asphyxia is likely or is impending, will often help to relieve foetal anoxia. Some workers[24] have even advocated inhalation of ozone by the mother in presence of foetal distress.

It may be assured that a concerted co-ordinated improved practice of obstetrics in centres of childbirth will help to reduce many of these preventable loss of lives in future.

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[9] *Am. J. Obst. & Gynec.*, **36**: 363, 1938.
[10] Obstetric Analg. & Anaesth.—Saunders, Phil., U.S.A., 1919.
[11] *Am. J. Obst & Gynec.*, **9**: 151, 1925.
[12] *Lancet*, **2**: 749, 1953.
[13] *Am. J. Obst & Gynec.*, **67**: 1224, 1954.
[14] *Lancet*, **2**: 138, 1935.
[15] *Lancet*, **2**: 1001, 1953.
[16] *M J. Australia*, **1**: 36, 1954.
[17] *Obstet. & Gynec.*, **3**: 366, 1954.
[18] *J. Obst. & Gynec. Brit. Emp.*, **61**: 477, 1954.
[19] *J.A.M.A.*, **146**: 1120, 1951.
[20] *Am. J. Obst. & Gynec.*, **64**: 1316, 1952.
[21] *Am J. Obst. & Gynec.*, **67**: 647, 1954.
[22] *J. Am. Chem. Soc.*, **63**: 314, 1941.
[23] *Gynec. et Obst.*, **52**: 196, 1953.
[24] *Bull. Fed. Soc. Gynec. Obstet.*, **4**: 819, 1952.

CURRENT MEDICAL LITERATURE

Analysis of E.C.G. in 1000 Young Aviators

PACKARD AND OTHERS (*Circulation*, **10**: 384, 1954) give in the following lines the summary of their observations on electrocardiographic findings in 1000 young aviators:

Ninety-six per cent of a group of 1000 healthy aviators whose electrocardiograms were analyzed in 1940-1942 were traced after an interval of at least 10 years.

Two hundred and two men had died. Trauma caused 193 deaths, disease seven, and the cause was unknown in two. Only one man died of heart disease (myocardial infarction); his electrocardiogram had been normal in 1941.

Seven hundred and three men were re-examined and only four were found to have objective evidence of heart disease: one had coronary heart disease with myocardial infarction, two had hypertensive heart disease, and one had chronic cor pulmonale. Eight other men showed enlargement of the heart by x-ray examination, without other evidence of heart disease. Twelve others had blood pressures greater than 145/95 mm. Hg. with otherwise normal findings.

In 639 men the 1940 and 1950 electrocardiograms were subjected to statistical analysis. The heart rate increased from a mean of 64 to 75 beats per minute, the mean P-R interval increased from 0·154 second to 0·159 second despite the increased heart rate; the mean QRS duration changed only slightly from 0·087 second to 0·085 second, and the mean uncorrected Q-T interval decreased from 0·334 second to 0·361 second. The QRS axis (mean frontal plane QRS vector) shifted to the left from 61·6 degrees to 48·2 degrees, and the T axis (mean frontal plane T vector) likewise moved slightly to the left from 42·6 degrees to 40·7 degrees.

The effect of change in heart rate, age, weight, and blood pressure on these electrocardiographic measurements is discussed. On the basis of these findings ranges of normal are proposed which vary only slightly from those suggested by other authors.

Certain unusual cases were not included in the statistical analysis but are described briefly. These include two instances of the Wolff-Parkinson-White syndrome, two instances of complete right bundle-branch block, and one instance of complete left bundle-branch block.

There was a wide range of measurements of the electrocardiograms of these healthy men but in the individual cases the change over a 10-year period was relatively slight. This was true both for the normal electrocardiograms and for those which fell in the borderline zone between normal and abnormal. Reliability and validity of the electrocardiographic method is discussed in the light of these findings.

Hepatic Radioactive Surveys

STIRRET AND OTHERS (*Am. J. Gastroenterol.*, **21**: 310, 1954) in reporting on clinical applications of hepatic radioactive surveys describes the method of hepatic radioactivity survey, employing colloidal gold (Au 198) as the tracer agent and a new scintiscanner as the recorder of the gamma radiation. The procedure does not require any special preparation of the patient. A single intravenous injection of 300 microcuries of Au 198 is administered. After a delay of 30 minutes to allow maximum concentration of the radiogold within the liver, the patient is positioned under the scintiscanner. The scanning speed and counting rate are set to obtain the maximum ratio between the concentration of radioactivity within the liver area and remainder of the body, and scanning is begun. Each complete scan of the liver requires 60 to 80 minutes. Upon completion of the scanning, the exact location of the xiphoid process, costal margins, liver edge or palpable subcostal mass is marked upon the scintigram for the purpose of anatomic orientation. Scanning may be repeated for as long as twenty-four hours after injection of the isotope to confirm the presence of foci of decreased radioactivity. After twenty-four hours an insufficient amount of radioactivity is present within the liver to yield a satisfactory scintigram. The homogenous distribution of radioactivity recorded by the scintiscanner over the area occupied by normal liver parenchyma is apparent. Neoplasms, abscesses and other space-occupying lesions destroy or displace the Von Kupfer cells. Therefore foci of decreased or absent radioactivity recorded on the liver scintigram represent areas of normal liver parenchyma which has been destroyed or displaced by such space-occupying lesions.

Hepatic scintigrams have been obtained in a series of twenty-three patients. Twenty-two of these patients had carcinoma of the liver proven by operation or autopsy. The other patient had been suspected of harboring metastatic hepatic carcinoma, but at subsequent operation, large abscess occupying the right lobe of the liver was found.

In nineteen of the twenty-two patients with proved metastatic carcinoma, areas of decreased radioactivity were observed on the scintigram which corresponded closely to the areas involved by the metastases. In three patients, no foci of decreased radioactivity were observed. In each of these three patients, the largest metastasis observed at operation was less than two centimeters in diameter and was not detected by scintography.

The preliminary results indicate that hepatic scintography may prove to be a valuable clinical diagnosis procedure for the detection and localization of space-occupying lesions of the liver. The test provides the clinician with an accurate means of selecting areas of the liver for needle biopsy in patients suspected of having hepatic neoplasm, cyst or abscess. The procedure is of value to the surgeon not only for diagnostic purposes, but in planning the surgical approach to such lesions.

Gastrointestinal Repercussions of Portal Hypertension

ALESSANDRINI (*Policlinico*, **61**: 1133, 1954; Ref. *J.A.M.A.*, **157**: 186, 1955) writes:

Portal hypertension has marked repercussion on the gastrointestinal tract, and the localization of these secondary disturbances helps to establish whether the hypertension is due to a diffuse process (cirrhosis) or to a circumscribed one (neoplasm, parasitic abscesses, or

cysts). The functional disturbances secondary to portal hypertension involve the motility of the digestive tract, the absorbing power of the intestinal mucosa, and the secretory function of the digestive glands. The muscular fiber cell is, however, the first to be affected, because it is sensitive to the variations of the oxygen content of the capillaries that are caused by the speed of the circulation. The functional gastrointestinal changes caused by portal hypertension are spasm, diffuse or segmental atony, hypermotility, or motor paresis. The difference in motor reaction (atony or spasm) is correlated with many factors, but it depends mainly on the degree of the hypertension. Studies of the author and his school revealed that often a mild stasis results in a tendency to atony of the intersphincteric zone and an increased tone of the sphincters, while the opposite phenomenon occurs when the stasis is marked. With regard to the gastric secretion, these studies indicated that with a mild hypertension the acidity values are increased and *vice versa*. One of the commonest effects of even the slightest hypertension is a decreased tone of the cardia and the lower part of the esophagus. This is evidenced by eructations and regurgitations, especially during the climax of the digestive process, that is, when the blood flow into the abdomen is highest and hypertension therefore more evident. In some cases the presence of a portal hypertension may be suggested by a sense of postprandial epigastric tension, in others by a late pain simulating an ulcer. It also causes a diminution of the absorbing power of the intestine, which results in dyspeptic thirst, opsiuria, and tympanitis, and these are the most important premonitory signs of portal hypertension. Besides the marked tympanitis in the small intestine, it also causes alterations of the defaecation rhythm, with constipation when the stasis is mainly in the inferior mesenteric vein, and a haemorrhoidal state in the rectum. One of the main clinical characteristics of the functional alterations secondary to portal hypertension is their tendency to be more or less uniformly distributed to the entire abdomen, so that the concurrent presence of esophageal, gastric, intestinal, and pancreatic symptoms should suggest the presence of portal hypertension. The clinical examination should be accompanied by roentgenography, endoscopy, and coprology. The early detection of a slight reversible portal stasis on the basis of its gastrointestinal repercussions has great prophylactic value because permanent and irreversible anatomic alterations can be prevented.

Varied Clinical Manifestations of Cirrhosis of the Liver

RAFSKY AND OTHERS (*Am. J. Gastroenterol.* **21** : 302, 1955) in reporting on the study of fifty-nine unselected hospital cases of chronic liver disease observe that 35 were males and 24 were females, ranging in age from 21 to 68 years. It is pointed out that cirrhosis of the liver did not present a uniform picture in 20·4 per cent of the cases. Seven cases are reported in detail and two others are commented upon. The presenting clinical picture of cirrhosis of the liver may simulate gastrointestinal malignancy, gallbladder disease, obstructive jaundice or a bleeding peptic ulcer.

Radioactive Iodine in Incapacitated Euthyroid Cardiac Patients

BLUMGART AND OTHERS (*J.A.M.A.*, **157** : 1, 1955) give below the summary of results in treatment of 1070 patients with angina pectoris and congestive failure with radioactive iodine :

Hypothyroidism can be regularly induced in euthyroid patients by one or more appropriate doses of radioactive iodine. After such treatment in 50 clinics of 1,070 patients with intractable angina pectoris or congestive failure, approximately 75 per cent of the 720 patients with angina pectoris showed worth-while improvement (half of these showed marked improvement and half a good result), and approximately 60 per cent of the 350 patients with congestive failure showed worth-while improvement (approximately 20 per cent of these showed marked improvement and 40 per cent moderate improvement). In the clinical management of these patients, small daily doses of thyroid are usually administered to maintain the lowest metabolic rate consistent with comfort. In intractable cardiac cripples who are usually considered for surgery, hypothyroidism induced by radioactive iodine gives improvement through medical means without the risk and complications of surgery.

Total Alkaloids from Rauwolfia in Hypertension

KLEINSORGE AND WITTIG (*Medizische*, **13/12** : 1086-89, 1954, Ref. *J.A.M.A.*, **158** : 1356, 1954) write :

Rivadescin, a commercial preparation of Rauwolfia serpentina containing alkaloids of the ajmalin and serpentin group, was given a therapeutic trial in 84 ambulatory patients with hypertension. Of the 84 patients, 18 (21·7 per cent) had labile hypertension, 11 (13·3 per cent) had fixed hypertension, and 55 (65 per cent) had blood pressure levels that varied but were never normal. The total dose of the administered Rauwolfia alkaloids varied between 46 and 400 mg. The daily dose never exceeded 10 mg. The average period of observation was 15 months which included a pretreatment period in 25 patients and an adequate post-treatment period in 23 patients. The mean values of diastolic and systolic blood pressure were determined according to Martini's arithmetical formula to make them statistically sound. A significant drop in blood pressure was observed in 42 patients (50 per cent). The reduction of systolic pressure was somewhat more pronounced and more frequent than that of the diastolic pressure. Patients with essential hypertension showed a slightly better response than those with nephrogenic hypertension. The best results occurred in hypertensive patients in whom cardiac disturbances predominated. Fifty-five patients (65 per cent) considered themselves improved regarding dyspnoea, overexcitability, headache, and tinnitus after 10 to 14 days of treatment. Corresponding organic changes could not be found by examination of the ocular fundus, electrocardiogram, and renal function tests. The subjective improvement did not parallel the hypotensive effect of the drug. Most patients who did not show a statistically sound reduction of their blood pressure reported subjective improvement, and only few of the patients with nephrogenic and fixed hypertension did not obtain a

reduction in blood pressure or subjective improvement. Side-effects of the drug consisted of fatigue, a mild laxative effect, and occasional hyperaemia of the nasal mucous membrane. The following treatment schedule is recommended: For the first four days 1 mg. of the drug should be given at night, and within the following 10 days the dose should be increased gradually to 2·3 mg. given three times daily. This dose may be maintained for two to three weeks and then discontinued. If a hypotensive effect cannot be obtained with a daily dose of 6·9 mg., it will not be obtained with a higher dose. Treatment may be resumed after an interval of two to three months, with a good chance of success, but because of acquired tolerance the dose of the drug must be increased. The hypotensive effect of Rivadescin and its effect on subjective complaints exceeds that of all other drugs even that of reserpine, although the sedative effect of the latter may be more pronounced.

Postpartum Hypopituitarism

SHEEHAN (*Am. J. Obst. & Gynec.*, **68**: 202, 1954) writes that hypopituitarism is one of the most serious long-term sequelae of obstetric complications, in comparison with which prolapse, stress incontinence, and pelvic adhesions are only minor local inconveniences. The primary pituitary lesion occurs at the time the patient is under the care of the obstetrician. If the obstetric conditions have been such (retained placenta or postpartum hæmorrhage) that this lesion might have occurred, the obstetrician should inform the family doctor, so that any subsequent hypopituitarism can be diagnosed early, because these patients generally do not consult anyone about their amenorrhoea. During the general circulatory disturbance that follows postpartum hæmorrhage the blood supply to the anterior lobe of the pituitary is interrupted and it then undergoes ischæmic necrosis (infarction). If the original necrosis involves more than about two-thirds to three-fourths of the lobe there will be some subsequent pituitary insufficiency; if it involves practically all of the lobe the subsequent insufficiency will be severe. The patient then continues as a chronic invalid for from 5 to 20 years and dies in coma. A table that records the incidence of fresh pituitary necrosis at autopsy in 127 patients who died 12 hours to 35 days after delivery and another table showing the incidence of symptoms of hypopituitarism in 166 live patients some years after delivery both indicate the causal importance of hæmorrhage and shock at delivery. The clinical picture of hypopituitarism is not well understood and these patients often do not seek medical aid because they are mentally dull. This explains why this cause of chronic invalidism in women was formerly believed to be a rarity. In the past few years it has become clear that the condition is relatively common. A series of nine cases that were proved at autopsy during the past four years are recorded to illustrate the standard clinical and pathological pattern and its variations. The necropsy in the first patient revealed that the pituitary had a normal stalk and pars tuberalis, but the posterior lobe showed areas of atrophy. The anterior lobe was represented by a little fibrous tissue in which only a tiny lamina of parenchymal cells could be found, estimated as about 1% of the original gland. Clinically the patient was of hypothyroid type and might well have been described as having 'pituitary myxœdema'. The thyroid was small, but the most striking secondary change found at autopsy was the severe atrophy of the adrenals.

Placental Globulin in the Prevention of Measles

GANGULI AND MUKHERJEE (*Brit. M. J.*, **2**: 1306, 1954) from analysis of the results from the injection of placental globulin to 32 patients in the diphtheria ward of the Medical College Hospitals, Calcutta, give below an assessment of the value of placental globulin as a prophylactic agent against measles.

The 32 patients who had not developed a rash were given antimeasles serum (placental globulin) 24 hours after the detection of the first case. All the cases were under treatment for diphtheria.

The protection rate of 96·0 per cent which was obtained may have been due partly to the prompt and effective isolation of the patients who developed measles, together with the immediate immunization of all contacts.

There was no reaction with 2 ml. of placental globulin, but with 4 ml. two out of three developed a reaction. It is suggested that the high reaction rate of the previous observers might have been due to the use of larger doses of the antiserum.

Infantile Diarrhoea

MISRA AND GUPTA (*J. A. Physicians of India*, **2**: 50, 1954) in reporting on the study of 100 consecutive cases of infantile diarrhoea in children under the age of 2 years, who were treated in the medical wards of the Gandhi Memorial and Associated Hospitals, Lucknow observe:

Of these 11 were breast fed, 29 were fed artificially and 60 cases were both breast fed and artificially fed. The severity of the diarrhoea was much milder in the purely breast fed children. In only 7 cases was teething a noticeable feature. 57 children had no symptoms or history suggestive of teething trouble preceding diarrhoea, and 36 had not cut any tooth. Parenteral infection was found in 46 per cent of the cases and out of these it was primary in 26 and the rest were secondary. Of the primary infections the commonest were bronchopneumonia, septic throat, and otitis media. The culture examination was done in 92 cases—salmonella was found in 2 cases, *proteus morgani* in 11 cases, *proteus vulgaris* in 6 cases, *pseudomonas pyocyaneus* in 2 cases, *paracolon group* in 3 cases, *B. coli* only in 66 cases and *Entamoeba histolytica* in 2 cases. The last finding was most surprising. Sweeps from the *B. coli* colonies, in 42 cases were put up for agglutination against antisera for 0111 B4, 055 B5, 026 B6, and in no case did the authors find any significant agglutination. In the microscopic examination of the stools pus cells were present in only 36 cases. No pathogenic active *Entamoeba histolytica* or cysts or ova were found in any case. In

the treatment the authors obtained best results when sulphaguanidine combined with iodo-hydroxy-quinoline was given.

ACTH and Cortisone Maintenance Therapy in Nephrotic Syndrome

LANGE AND OTHERS (*Am. J. Dis. Child.*, **88**: 529, 1954) write:

21 patients with the nephrotic syndrome were observed carefully on maintenance therapy for 6 to 36 months. Six cases received corticotropin (100 mg. for three successive days of each week), 15 patients were given 400 mg. of oral cortisone on three successive days of the week for 6 to 52 weeks. This followed an initial course of corticotropin (100 to 160 mg. per day for seven days), which had led to diuresis. During maintenance therapy, proteinuria disappeared in the four cases treated within three months of the onset of the disease. In all other cases the degree of proteinuria was markedly reduced and blood chemistries returned in all cases rapidly to normal. The authors report that the maintenance therapy is valuable only when the initial course of corticotropin successfully induces complete diuresis with rise of complement to normal. The maintenance therapy has to be started within a few days after the initial course of therapy. Small doses of cortisone are ineffective for maintenance therapy because, with small doses relapses may develop. When high doses of cortisone were given, no relapses occurred during maintenance therapy. Maintenance therapy must be continued for long periods of time to prevent recurrences of the diseases secondary to upper respiratory infections or to sensitization reactions producing a recall phenomenon. The authors have not seen any untoward major effects even in small children, neither has there been any apparent impairment of the rate of growth and development.

Isonicotinic Acid Hydrazides in Tuberculous Meningitis

APPELBAUM AND ANDERSON (*J. A. M. A.*, **156**: 673, 1954) in reporting on ten consecutive patients with tuberculous meningitis treated with isonicotonic acid hydrazides observe:

The diagnosis was confirmed in all cases by recovering the *Mycobacterium tuberculosis* from the spinal fluid. Roentgenologic evidence of pulmonary tuberculosis was found in five cases. In most instances a dose of 8 mg. per kilogram of body weight per day was used. Of the 10 patients, 7 recovered and 3 died. The survivors have been observed for periods ranging from 20 to 23 months, and they have been in good general physical condition and have normal mentality.

In this series several of the patients showed toxic side effects referable to the central nervous system. Three of the cases were complicated by blindness, which cleared up completely in one patient and partially in another. Relapse occurred in three patients. These patients responded satisfactorily to re-treatment with hydrazides.

Rheumatic Fever and Rheumatic Carditis in Children as seen in Clinic Practice

DAVIS AND GREENE (*Am. J. Dis. Child.*, **83**: 427-37, 1954) write that the clinical manifestations of rheumatic fever have undergone a vast change of character. The text-books still continue to describe classic attacks of rheumatic fever in terms of polyarthritis, fever, elevated sedimentation rate, arthralgias and prolonged P-R intervals. In the authors' experience and in the experience of most students of rheumatic fever these cases are now rarely encountered. Major and minor criteria, when present are of utmost diagnostic importance, but these are absent in the great majority of cases seen in the clinic. The 'typical' case in their experience has no explosive attacks and few or none of the orthodox classic manifestations. Often, in fact, the parents are unaware that the child is ill. The patient sees the physician for some minor complaints, such as pallor, fatigue, emotional disturbance, or poor eating or sleeping habits and on examination a diagnosis of carditis is made. The child's symptoms may remain unnoticed unless the parents are questioned minutely. When the cases are considered from an over-all point of view one sees that the outstanding manifestation of the disease process is carditis, frequently smouldering in nature. In many cases the carditis is so mild as to render diagnosis most difficult and immediate determination of activity of the disease almost impossible. This is the type of case that remains undiagnosed until obvious and irreparable total cardiac damage has occurred.

In this study the authors present an analysis of the total number of cases surveyed during the years 1951-1952 and also present diagnostic technique and criteria.

A total of 306 school children were seen. In this group, 2 out of every 3 patients surveyed did not present sufficient evidence upon which to make a diagnosis of heart disease or suspected heart disease. More than one-third of this group presented the clinical evidence which dictated the possibility that rheumatic heart disease might develop in the future. These cases were therefore defined as potential heart diseases. More than 10 per cent of this group had congenital heart disease and almost one out of every 10 children presented unequivocal evidence of rheumatic heart disease. It is noteworthy that only one of this group of rheumatic children was found to have definite acute rheumatic heart disease.

The authors' summary of the 'areas of inquiry' where the physician may make a positive or presumptive diagnosis of rheumatic heart disease is as follows:

Positive diagnostic criteria—1. Rheumatic heart disease in both parents of the patient, justifies, a diagnosis of potential heart disease in the presence of cardiac findings of questionable significance.

2. The finding by fluoroscopy of an enlarged left auricle and left ventricle in the absence of clear criteria of congenital heart disease predicates the diagnosis of rheumatic heart disease until proved otherwise.

3. Grade III systolic or louder murmur at the apex, transmitted to the left axilla will prove to be rheumatic heart disease in most children examined in the clinic.

4. Evanascent prolongation in the A-V conduction in the presence of other 'rheumatic-like' symptoms is considered evidence of carditis.

5. A prolonged electrical systole (Q-Tc) is evidence of presence of carditis and failure to find a specific explanation for the carditis leaves rheumatic carditis as the diagnosis of choice.

Presumptive diagnostic leads—1. A positive family history of rheumatic fever and/or rheumatic heart disease in a 'sickly' child with easy fatiguability is presumptive evidence for a mild rheumatic activity in the absence of classic manifestations.

2. Definite changes in heart sounds and murmurs on repeated examinations should point to further exploration for the presence of mild carditis.

3. Presence of chorea or a history of Sydenham's chorea in the presence of minimal cardial findings should serve as an incentive for the further assessment of the heart for the presence of rheumatic heart disease.

4. 'Non-specific' E.C.G. findings in a child who is otherwise well, especially prolonged A-V conduction, notched P waves, etc., may be the only presumptive signs of rheumatic heart disease.

5. A generally enlarged heart in a child in the absence of any definite etiologic diagnosis, may be considered as presumptive evidence of rheumatic heart disease.

Helpful leads in diagnosis—1. The child who is not well but is not definitely ill may harbour a mild insidious carditis.

2. An older child who shows a marked depletion of vital capacity in the absence of upper respiratory or pulmonary disease may thus show early left ventricular insufficiency in rheumatic carditis.

3. Progressive pallor out of proportions to the level of the haemoglobin is similar to the almost typical pallor of active rheumatic carditis.

4. Their experience does not warrant an adherence to some of the common mentioned laboratory criteria like raised E.S.R., antistreptolysin titre, low grade fever etc.

Eosinophilia in Children

PATEL (*Indian J. Child Health*, 4 : 49, 1955) from the investigation of 200 children with rise in eosinophil cells observes :

These have been divided into two groups : (*a*) the lower group with an eosinophil cell count of 500 to 2000 per c.mm., (*b*) higher group with eosinophil cell count above 2000 per c.mm.

In the lower group intestinal infection or infestation, was found responsible for the rise in eosinophil cells in the majority of cases. In these the appropriate treatment for infection gave satisfactory results.

A small proportion of the lower eosinophil group failed to improve and in these, arsenical therapy was successful. These were cases of potential high eosinophilic group.

In the higher eosinophil group, the outstanding features of the condition were persistent cough, with or without asthma, loss of appetite, high mottling or increased bronchial marking in the lung fields and a satisfactory response to arsenic therapy.

A.C.T.H. has been found a useful agent in patients with eosinophilic asthma. It has failed to produce a complete cure.

Intravenous T.A.B. has not been found a satisfactory therapeutic agent as it produces a transient reduction in the eosinophil count, which returns to the original figures on cessation of therapy.

Histamine fast achlorhydria observed in some patients needs further investigations.

Vole Bacillus and B.C.G. Vaccines

FREW AND OTHERS (*Brit. M. J.*, 1 : 133, 1955) in reporting on the observations designed to compare vaccination with B.C.G. and the vole bacillus vaccines and recording the preliminary results after one and two years write :

The B.C.G. was given in the routine intradermal manner and the vole vaccine by multiple puncture to those of 5 years and over and intradermally to those under 5 years. Vaccination by the multiple puncture method is probably slower than by intradermal injection, but it is considered to be the method of choice and is simpler and more certain in young children.

The rate of conversion after vole vaccination is a little slower than after B.C.G., but the percentages—95 per cent after six weeks and 100 per cent after twelve weeks—are very satisfactory, and compare closely with those obtained with B.C.G.

The authors believe that vaccination with vole bacillus has certain advantages because of the milder clinical course and the smaller rate of reversions.

The periodic surveys showed that induration developed in a substantial proportion of the cases receiving vole vaccine by the multiple-puncture method, and that, later, lupoid reactions occurred in the vaccination area. These later complications were noted in 5 per cent and 15 per cent of the cases inspected after the first and second years. The discovery of lupoid reactions at the second yearly inspection in arms regarded as healed at the first yearly inspection was unexpected and unfortunate, and the authors regard the rate of these reactions to be too high to permit of the routine use of the vaccine until these difficulties have been overcome.

Tuberculous Mesenteric Adenitis in Children

WALLIS (*Brit. M. J.*, 1 : 128, 1955) in drawing attention to a cause of minor illness in children which is overlooked observes that tuberculous mesenteric glands may sometimes cause symptoms and continue to do so even after they have become calcified.

The symptoms described are colicky central abdominal pain, nausea, vomiting, sweating, meteorism, diarrhoea, constipation, pallor, lassitude, and loss of weight. The physical signs are palpable tumours in the abdomen, local tenderness, fever (especially in the evenings), and calcification visible in the x-ray film.

The radiological appearance of tuberculous glands is usually unmistakable. They are round or oval; the shadows are not homogeneous, but mottled, and appear like a mulberry or an archipelago as seen on a map. They may lie anywhere in the abdomen, but are usually

seen along the line of attachment of the mesentery of the small intestine. In the lateral view they are often in front of the spine.

Twenty cases are described, including examples presenting with pain, pyrexia, attacks resembling acute appendicitis, tuberculous rheumatism, and the coeliac syndrome.

Treatment with 50,000 units of calciferol daily for six weeks is recommended as a means of expediting the natural process of healing.

The incidence of abdominal tuberculosis has been investigated. It is concluded that in the area under review it is now nearly as common as pulmonary tuberculosis. It seems to be more common in boys than in girls.

A survey of unselected normal schoolboys led to the discovery of further cases which had in the past caused baffling symptoms. In this group abdominal tuberculosis was more common than pulmonary.

The relation between the incidence of the disease and the consumption of raw milk is discussed.

CURRENT TOPIC

On 7 April 1948, the Constitution of the World Health Organization officially came into force. The anniversary of this historic date is now observed each year, in most of the Member Countries of WHO, as World Health Day. The date thus marks a highly significant advance in international co-operation for improved standards of health.

The importance of pure water supplies in the prevention of a host of diseases which are transmitted from person to person through water used for various household purposes has inspired the choice of the theme for this year's observance of World Health Day. This theme is : "Clean Water means Better Health". It is a subject of particularly great significance for the countries of South East Asia.

We reproduce below two feature articles one by G. Candau and the other by Abel Walman.—ED., *J. Indian M. A.*

CLEAN WATER MEANS BETTER HEALTH

MARCOLINO G. CANDAU, M.D.,

Director-General, World Health Organization.

Abundant supplies of clean water have always been a necessary condition for the rise of the great civilizations of history. Civilizations and cultures were nurtured in the valleys of famous rivers—the Nile, the Euphrates, the Indus, the Ganges and the Yangtse. As these civilizations flourished, however, their growing populations only too often themselves poisoned the waters on which their life depended.

As little as one hundred years ago, cholera, typhoid, the dysenteries and other diseases caused by polluted water still ravaged the peoples of all the continents. Then around 1850 there began what has been called the Great Sanitary Awakening. Through the pioneering labours of people like Chadwick, Shattuck and Snow, and the discoveries of scientists like Pasteur and Koch, the foundations were laid of the great science of public health, which has achieved almost miraculous results during the last few decades in bringing down mortality rates and raising health standards.

A great deal of this improvement in Western Europe and North America has been due to the purification of water supplies and the sanitary disposal of human wastes.

Although spectacular results have been achieved, no country in the world can yet afford to relax its vigilance concerning water sources and supplies. We must not forget that serious and widespread cholera and typhoid epidemics were still occurring in Europe and America at the end of the nineteenth century. As late as 1937 a momentary breakdown in the water-purification system of Croydon, near London, let loose a terrible epidemic of typhoid fever. In Marseilles in 1943 there were 639 cases of typhoid with 127 deaths, mostly due to the drinking water. In the immediate post-war years 250,000 cases of typhoid fever with 25,000 deaths were occurring annually in Europe. In Mexico it was estimated that in 1948 22 per cent of all deaths were caused by water-borne diseases. Experts believe that in many Asian countries the sickness rate could be halved by protecting water supplies and providing proper facilities for the disposal of wastes.

There is an added need for vigilance in areas where farming methods are being modernized, industries are expanding, and populations are becoming denser. Particularly careful planning is then needed to assure sufficient water supplies for homes, factories, irrigation and electric power, and to solve the complementary problems of the disposal of sewage and industrial wastes. In a number of countries elaborate processes are being developed for reclaiming, from these wastes, water that can be used for many important purposes.

The privileged citizens who can unquestionably trust the water which flows from their household taps or their village pumps and fountains should reflect on the constant labours of the army of scientists, laboratory workers, engineers, health administrators and other highly-trained personnel which have made it possible for them to enjoy an abundance of palatable and safe water. They should also realize their responsibility to avoid polluting lakes, rivers and subterranean water reserves.

As for those—they are unhappily the great majority of the human race—who do not enjoy the benefits of a protected water supply, it is my earnest wish that they and their village and municipal authorities will redouble their efforts to remove one of the main obstacles to their future progress. They and the authorities responsible for safeguarding their health may take courage from the hard-won experience of other lands where the financial outlay required to ensure adequate supplies of safe water in city, town and village has always been repaid hundreds of times over in terms of increased productivity and greater prosperity.

The purpose of World Health Day 1955 is to help stimulate understanding of the basic relationship be-

tween water resources, health and civilization itself, thereby, I sincerely hope, hastening on the time when the whole of mankind will be freed from the vast, costly and needless burden of waterborne diseases.

"PURE WATER" RULES 4,000 YEARS AGO

ABEL WOLMAN,

The John Hopkins University, Baltimore, U.S.A.

Man can live without clothes, without shelter and for some time without food. Without water, however, he soon perishes. It is not surprising therefore that from the earliest period of man in geological history, evidences of human habitation have been closely associated with rivers, springs, wells or other primitive sources of water.

Throughout history, it has been said, "after the passion of love, water rights have caused more trouble than anything else to the human species."

As time went on, the search for water for survival was gradually paralleled by an equally persistent quest for "pure" water. For thousands of years, people increasingly demanded a more satisfactory water for drinking and other purposes.

Through the centuries, to be sure, definitions of purity varied, as users became more sophisticated in understanding and in demands.

Criteria of purity became more complex, more quantitative and more rigid as the scientific principles of water-borne diseases were elaborated, as aesthetic requirements became more refined and as industrial processes matured into major significance.

These changes were slow, at least in the first few thousands of years of the search for pure water.

In the last century and in many countries, but unfortunately not in all, the search has been intensified with overwhelmingly fruitful results within economic attainment.

Today, the consumer in these countries need not use dirty water, or one biologically unsafe, or chemically objectionable, or even unsatisfactory to the taste or to the smell.

To trace the practice which made these accomplishments possible, through almost 4,000 years, would require many volumes. It is possible, however, to cull from the history of these years important eras and to list at least a few of the relatively unknown individuals to whom society owes a debt impossible of repayment.

Who were these great "hewers of wood and drawers of water" to whom Joshua gave immortal prestige?

By the early nineteenth century in England, pure water already had caught the popular imagination sufficiently to justify the following lines on the water carts from which water was sold in Monkwearmouth :

> "It's limpid and clear from all mud,
> This water I sell for the public good;
> Its excellent virtues no mortal can tell,
> So sweet is the water from Union Well."

Poor poetry, it is true, but it challenges us to find who brought this desire into public acceptance and made its fruition increasingly possible.

"It is good to keep water in copper vessels, to expose it to sunlight, and filter through charcoal" is a dictum not out of an engineer's report in 1954, but presumably from a collection of medical lore in Sanskrit of a probable date of 2,000 B.C.

From another Sanskrit source of the same period more comprehensive and remarkably modern water purification suggestions appear in the following terms: *"Impure water should be purified by being boiled over a fire, or being heated in the sun, or by dipping a heated iron into it, or it may be purified by filtration through sand and coarse gravel and then allowed to cool."*

From ancient times to about the seventeenth century processes for improving the quality of water appear in the literature of Egyptian customs, of Biblical lore, of Greek and Roman practice, of devices in Arabia and Persia; all showing remarkable empirical forerunners of the scientifically elaborated techniques of the eighteenth to twentieth centuries.

Great engineers and great philosophers contributed to these dicta and arts during thousands of years, most of them unknown and many unsung! As records became clearer, the names of Vitruvius, Hero of Alexandria, Pliny, Hippocrates, Frontinus, Avicenna, appear as the reporters and even builders of works for transport and purification of waters.

M. N. Baker, in his remarkable treatise, *"The Quest for Pure Water"*, attributes to the seventeenth century significant experimental efforts in water purification by Sir Francis Bacon of England; Johann Rudolph Glauber of Germany; Luc Antonio Porzio of Italy (for his multiple sand filters); to unknown engineers for the filter-cisterns at Venice ; and to unsung engineers for the first known designs for an industrial water purification plant for a paper mill in Auvergne, France.

The quest for pure water in the eighteenth century, as Baker aptly puts it, "was keen but the quarry was small."

Although four centuries of filtration had passed in France, the bulk of practice had been on small scale house and industry use.

From the late eighteenth century on, however, the work of Amy, Smith, Cuchet, Montford, Ducommun, Mallet, Fonvielle, Souchon, Puech and Chabal deserve permanent recording.

In England, Scotland and the United States the nineteenth and twentieth centuries marked the great sanitary awakenings in both the understanding of the broad relationships of pollution of water to disease and the development of large-scale efficient and economical processes of water purification.

In this progress, England and Scotland deserve primary honours for the early pioneer work in filtration and chlorination.

The American workers in the twentieth century extended application widely and perfected large-scale equipment in the field of so-called rapid filtration and chlorination.

To list the names of all the important contributors to these advancements would be impossible, but it is perhaps not too invidious to select a few whose activities bulked large in our retrospective assay of producing pure water.

In England and Scotland, undoubtedly the following deserve mention for peculiarly distinctive ingenuity and imagination either in experiment or in large-scale application of water purification principles and devices :

James Peacock for his extraordinary filter patent in 1791; James Simpson for the great slow sand filters for London in 1829; Thomas Telford for his early, but unsuccessful, filters for Glasgow in 1807; Robert Thom for his filters in Scotland in the 1820's; Angus Smith for his concepts of filtration in the 1840's; Edwin Chadwick, the great lay sanitary reformer of the mid-nineteenth century; Percy F. Frankland, one of the first to point out the great significance of filters in removing bacteria (1886); and Sir Alexander Houston, the great scientist-poet investigator of water problems and director of the laboratories for the control of the water supplies of London.

The contributions of America to the development of pure water are generally conceded to be in the development of the rapid filter from 1880 to 1900, in the improvement in slow sand filters (primarily in Massachusetts) and in the great advances in chlorination since the beginning of the twentieth century.

To these efforts, again with apologies to those whose names may be omitted solely for want of space, the following undoubtedly gave significant and lasting support by experiment, by application and by promotion of widespread adoption : James P. Kirkwood, William Ripley Nichols, Allen Hazen, Hiram F. Mills, George W. Fuller, Thomas M. Drown, George C. Whipple, Frederick P. Stearns, George A. Johnson, Robert Spurr Weston, and Joseph W. Ellms.

Undoubtedly, a number of individuals identified with private companies manufacturing filters and appurtenances contributed to the perfection of methods of coagulation and filtration of water.

The Hyatts, the Jewells, the Cooks and others who fought through the patent contests of the early twentieth century deserve mention in any summary of the evolution of water purification.

One of the lasting contributions to water safety was in the development of cheap but effective equipment for applying accurately small and large quantities of chlorine to water. Without such equipment control procedures would have been delayed for many years.

Undoubtedly the inventions of Major C. R. Darnall in 1910, of George Ornstein in 1912 and of Wallace in subsequent years promoted water-chlorination to an unprecedented degree.

The work of Race, Houston and Bunau-Varilla pressed forward similar but less universal use of chlorine in England, France and Canada.

If the investigators in the Western world appear more prominently in the summary of water quality attainments in the nineteenth and twentieth centuries, it is only because these economically favoured areas showed greatest application of water purification during these periods.

In other areas of the globe, significant contributions to the science and art of water purification have been made, but their effective translation into great works have been in many instances materially retarded.

NOTES AND NEWS

Objectives of Medical Education

A panel discussion on medical education was held in New Delhi on 9-3-55 under the auspices of the Faculty of Medical Sciences, Delhi University. The Union Health Minister presided.

Eminent medical authorities from abroad participated in the discussion. They included Sir Cecil Wakeley, former President of the Royal College of Surgeons, England, and the members of the team of medical authorities now in the country under the Colombo Plan, Dr. Harold C. Edwards, Dr. M. L. Rosenheim, Dr. Robert J. Keller, Dr. Stanley A. Mason and Dr. M. C. Balfour.

Rajkumari Amrit Kaur stated that the most important problem in medical education confronting India was that the country needed a very great number of doctors for implementing its health programmes, but, at the same time care had to be taken to see that standards of medical education did not deteriorate.

All the more important suggestions made by the various speakers had a unitary aim, making the doctor a more effective social instrument with a heightened sense of responsibility towards society and increased efficiency in the discharge of it. Dr. Edwards stressed a good general education, character and ability and acquaintance with preclinical subjects like biology, physics and chemistry as the requirements of students seeking admission to medical courses. Lt. Col. Amir Chand said a background of culture and humanities was also essential. Dr. R. Viswanathan emphasized the need for maintaining the continuity of preclinical studies through the clinical years. He suggested that clinical studies of specific problems should be undertaken along with the necessary physiological anatomical biochemical and other background.

While serious research could be handled in the postgraduate phase, Dr. Rosenheim stated that the scientific spirit and interest in research should be inculcated during the undergraduate phase. Dr. C. G. Pandit, Secretary of the Indian Council of Medical Research, said research workers of the future could be spotted even during the undergraduate period and should be given special facilities. Dr. Birch, Principal of the Lady Hardinge Medical College, felt that students could be expected to handle research projects even during the undergraduate training. Dr. Balfour stressed the important role of preventive and social medicine in the undergraduate curricula. He suggested that 100 to 200 hours during the entire course should be devoted to the subject and students should have contacts with villagers in a country like India with its predominantly rural background. Lt. Col. C. K. Lakshmanan suggested that every college should have a separate department of preventive medicine with associated rural centres for field work. Dr. K. C. K. E. Raja pointed out that training in statistics was essential for defining the problems as well as suggesting solutions in public health. Dr. Rosenheim emphasized that students, even during the undergraduate phase, should be introduced to psy-

chiatry so that they would understand the relation between physical and mental illness and would realize that medicine in its larger aspects was concerned more with the social environment than with the individual alone.

The teaching of specific subjects was also discussed by the Panel. Sir Cecil Wakeley said that the undergraduate student should have six months' training in surgical principles though specialized surgery should come only in the postgraduate stage. Dr. M. Chaudhury stressed the importance of clinical experience as against lectures and suggested that the internship period for house surgeons should be six months instead of three. Dr. Rosenheim also pointed out that students learnt more at the bedside of the patient rather than in the lecture theatre. After finishing the course, the medical graduate should put in a period as an apprentice with a general practitioner. He felt that facilities for postmortem studies were not adequate in India.

Discussing the place of obstetrics, gynaecology and domiciliary midwifery in the curriculum, Dr. Keller stated that advanced acquaintance with these subjects should be left to the postgraduate phase but the undergraduate student should be able to recognize deviations and abnormalities. Dr. P. Malkani stated that the antenatal and postnatal clinics were ideal places for the students to become acquainted with the larger responsibility implied in social medicine.

International Congress against Alcoholism

The 25th International Congress against Alcoholism will be held in Istanbul, Turkey on 10-15 September 1956. This Conference will provide an opportunity for the presentation and discussion of the alcohol problem in all its aspects, with emphasis on those means that will most effectively combat its growth in all countries. It will be an opportunity for all those who, in every part of the world, are concerned to remove the barrier to social progress which alcoholism represents. Further information will be available from the International Bureau against Alcoholism, Case Gare 49, Lausanne, Switzerland.

Indian Pharmacopoeia Committee

The Government of India have been pleased to reconstitute the Indian Pharmacopoeia Committee as follows :

1. Dr. B. N. Ghosh, Professor of Pharmacology, R. G. Kar Medical College, Calcutta, Chairman, 2. The Chairman of the Pharmaceuticals and Drugs Research Committee of the Council of Scientific and Industrial Research (Ex-Officio), 3. Dr. B. B. Yodh, Professor of Medicine, Grant Medical College, Bombay and Honorary Physician, J. J. Hospitals, Bombay, 4. Col. R. N. Chopra, Director of Public Health and Director, Drugs Research Laboratory, Jammu and Kashmir Government, Jammu, 5. Dr. M. D. Chakravarty, Director, Central Drugs Laboratory, Calcutta, 6. Lt. Col. M. L. Ahuja, Director, Central Research Institute, Kasauli, 7. Dr. B. Mukerji, Director, Central Drug Research Institute, Lucknow, 8. Dr. S. Rangaswami, Professor of Pharmaceutical Chemistry, Andhra University, Waltair, 9. Shri B. V. Patel, Drugs Controller for the Bombay State, 10. Shri P. S. Krishnan, Chief Chemist, Central Revenues Control Laboratory, New Delhi, 11. Shri P. M. Nabar, Drugs Controller (India), New Delhi (who will also be the secretary to the Committee).

Members of the Committee other than the ex-officio member, will hold office for a term of five years. The Chairman of the Committee will have the power to form sub-committees whenever required and also to co-opt experts from outside on such sub-committees. The Committee will have the power to frame its own rules of procedure. The Indian Pharmacopoeia prepared by the committee will be published shortly.

Medical Facilities in Rural Areas

The Union Health Minister in inaugurating a conference of administrative medical officers from the States on 19-2-55, convened by the Health Ministry to discuss the health schemes in the Second Five-Year Plan discussed how preventive measures could be extended further and deeper into the rural areas so that 85 per cent of the country's population could get some measures of health benefits even if they could not be provided with all the modern medical facilities. She said, this should be the main objective of the health authorities during the present phase of development.

A rapid expansion of health services through the agency of full fledged health centres and the effective integration of curative and preventive activities appeared to offer best means of achieving this end. The development of maternal and child health services, including school health services, must be vigorously pursued and more attention than had been given so far must be devoted to public health laboratory services, to nutrition and to dental health.

As regards personnel requirements, the Health Minister hoped the medical authorities would be able to make a correct assessment of the requirements of health workers of different categories for the different phases. 'I shall be very sorry indeed if any of our plans were at any stage to be held up or slowed down for want of anticipation of this need in good time', she said.

While laying stress on the need for expanding medical benefits to rural areas, the Health Minister also stressed that there must be no letting down of sustained efforts during the next plan period in the fight against malaria, tuberculosis, leprosy, filaria and environmental insanitation.

Leprosy Training Course

The next Leprosy Training Course will be held at the School of Tropical Medicine, Calcutta, from 13th July 1955, for one month. The course is open to all registered medical practitioners. Members of the Indian Medical Association who have a special aptitude and desire further training in the subject, may apply for application forms etc. to, The Officer-in-charge, Leprosy Research Department, School of Tropical Medicine, Calcutta.

No registration fee will be charged from candidates attending the course. The completed application forms from the candidates should reach the above officer-in-charge by 31st May, 1955.

CORRESPONDENCE

The Editor is not responsible for any views expressed by correspondents

D.T.M. Course and Licentiates

SIR,—In reply to a question put to Dr. S. C. Sen, President, I.M.A. at the reception held in his honour at Rangapara (Assam) the other day as to why the Licentiates were now being debarred from sitting for the diploma of D.T.M. (Cal.), Dr. Sen replied that he met the authorities in this connection and they contended that as the Calcutta School of Tropical Medicine was now affiliated to the University of Calcutta, this post-graduate course, as per rule, is open to only the graduates of Medicine. After this he felt helpless and found it rather difficult to argue further. He therefore invited suggestions from members of the profession if there was any.

Now is this really as insurmountable a difficulty as it has been made out to be? After all rules are made by men and are subject to changes according to exigency. Where there are rules, there are also exceptions. Even Nature has its freaks. Licentiates who were not allowed to sit for the M.B.B.S. degree, were later made eligible for this by a change of the rule with one stroke of the pen. This class of medical practitioners are now fast dying with the abolition of the Medical Schools. Can the University therefore not frame a sub-rule to make these remaining Licentiates eligible for this course? Justice, fairplay and wider interest demand this, for no civilized government can debar its people from seeking more and more knowledge. And after all who will be benefited by this increased knowledge of the Licentiates, "the friend, philosopher and guide" of our rural people?—These dumb millions no doubt. Has the government therefore any right to deny this better medical facility to its people without any cost to the government?

We pause for an answer from those in authority. I am etc.

P.O. Barjuli,
Darrang (Assam).

M. S. AHMED,
CAPT. I.A.M.C. (RETD.).

REVIEWS

Year Book of Drug Therapy, 1954-1955 series. -Edited by Harry Beckman. Published by the Year Book Publishers, Inc.; 200 E. Illinois Street, Chicago 11, U.S.A. Pp. 392. Price $6.00 post paid.

This book is one of the 13 volumes of Practical Medicine Series of Year Books, ably edited by Harry Beckman. The whole subject has been conveniently dealt with in several groups and subgroups, thus enabling the reader to immediately refer to the particular subject he is looking for. Extensive fields have been covered in the space of 564 pages of text. A very large number of papers have been suitably abstracted for the reader who is further helped by many appropriate editorial comments and notes. A perusal of this volume will tempt the reader to keep it handy for easy reference, occasions for which are likely to crop up every now and then in the busy life of an up-to-date practitioner. Medical and reference libraries should all have a copy of this book.

Any Questions? from the British Medical Journal. Third Series. Published on November 8, 1954 from B.M.A. House, Tavistock Square, London, W.C. 1. Pp. 228; price 7s. 6d.

This is the third series of the interesting small volumes compiled from the questions and answers that came from all over the world and appeared in the pages of the *British Medical Journal*. The questions represent a large variety of day to day problems facing the practising doctor in various countries. The answers to the questions are elicited from anonymous experts on different subjects. Subsequent to appearance in the body of the *British Medical Journal*, these answers have been revised for the present volume. Cross references, of allied subjects, given at the end of each section, make the present volume more interesting. A cumulative index, for the three volumes of "Any Questions" series, incorporated at the end of this book, will be appreciated specially by all who possess a copy of all the three series. This book is well worth reading and keeping handy on the shelf of the busy practitioner for reference.

Advances in Internal Medicine, Volume VI.—By William Dock, M.D., Long Island College of Medicine, Brooklyn and I. Snapper, M.D., Beth-el Hospital, Brooklyn. The Year Book Publishers, Inc., 1954. Pp. 375. Price $10.00.

This is the sixth volume of the series, and has maintained the tradition of the previous volumes. In this volume the subjects dealt with are: Uropepsin, Glucagon —the hyperglycemic-glycogenolytic hormone of the pancreas, Diagnosis of Cancer of Internal Organs by Papanicolaou Technic, Spatial Vectorcardiography, The L. E. Cell Phenomenon, Biopsy Studies of the Liver and Kidney, Thrombotic Thrombocytopenic Purpura, Porphyria, Diaphragmatic Hernia, and Determination of Insulin in Blood.

The book is not meant for practitioners in general, but for those who would like to have a specialised knowledge in the subjects mentioned above. Students of advanced medicine will be well advised to read this volume which will be of much help in keeping them uptodate in the theory and practice of medicine.

The book is well produced, the printing and get up being of high order.

SUPPLEMENT
Journal of the Indian Medical Association

Vol. 24, No. 14 CALCUTTA April 16, 1955

XXIV PUNJAB PROVINCIAL MEDICAL CONFERENCE, TARN TARAN

The 24th session of the Punjab Provincial Medical Conference, representing Punjab, PEPSU, Himachal Pradesh and Kashmir States, was held on the 5th and 6th February, 1955 at Tarn Taran, a small town in the Amritsar district. The conference was well represented.

After the Flag Hoisting by Dr. Parkash Kaur, M.L.A. and National Anthem by the M.B. Girls' High School students, Dr. Atma Singh, the Chairman of the Reception Committee in a speech accorded welcome to the delegates and visitors. He dilated on the various health topics of the present day, viz. rural health, child welfare, quackery and preventive medicine. He said

"Today, the Doctor is called upon not only to diagnose and treat cases adequately, but also to actively participate in preventing and reducing the incidence of disease. He has yet another positive duty to perform that is to keep the people healthy. Health of people is the Nation's most vital asset. There is no hope for the future if the children and the youth of today are not both mentally and physically fit. It is also a fact, which cannot be denied, that the task of imparting instruction in health matters and promotion of the civic sense of the lay public generally rests on the shoulders of the medical men as well. Improvement of the Public Health of the Nation being an objective common to all, the Government, the public and this Association of ours, can be achieved only by the co-operation of us all. A small increase in spending on preventive medicine can well lead to a great saving in the cost of the curative services." He concluded by saying that the geographical greatness would not make India a great country, unless we make the people great and worthy of being called a great nation by imparting a sound mind in a sound body. Mr. Justice J. L. Kapoor inaugurating the conference said "If ever there was a profession which must receive the highest approbation from the state and respect from the people, it is the medical profession, because it is only this profession which relieves the human being of his pain and disease. It helps in keeping the human

DR. A. M. DEVA, THE PRESIDENT OF THE CONFERENCE

THE PRESIDENT, AND MEMBERS OF THE RECEPTION COMMITTEE WITH MR. JUSTICE J. L. KAPUR, WHO INAUGURATED THE CONFERENCE

race in proper health free from pestilence, disease and also from the various enemies of the human race which exist in the form of microbes, germs and viruses."

The President of the Conference Dr. A. M. Deva in course of his address said,

"The problems before the profession are so many and so varied that I do not know where to begin and how to do justice even to the most important amongst them. The problems are not of the medical profession alone, they have their bearing upon national health and physical well-being of our people and the general advancement of medical science in our country and throughout the world.

Rural Medical Relief

The conditions of the rural masses are appalling. Health Ministers, whether at the Centre or in the States, are thinking in terms of providing medical relief to the rural masses. They, at times, think of compulsory posting of medical students immediately before or after graduation in rural areas. They forget how these raw hands having no experience to their credit will be able to help the masses. The time which should have been utilised by them in gaining real experience in the wards of a hospital, is proposed to be spent in areas where no facilities for any scientific work exist. There are neither laboratories nor any hospitals worth the name where these young men will go and work. In a way the rural people will provide the training ground for these young medical men. I hope our leaders do not have this in their minds.

The idea of putting fresh elements in charge of rural areas does not appeal to me. Nor have the appeals to medical men to go to the countryside any value. The authorities expect medical men to go to areas where they themselves have failed to provide the basic needs of every day life. May I say that even those members of the legislature who have been returned from rural areas and who are foremost in making appeals to medical men are sticking to towns. To ask a medical man to go and settle in a village, as the Christian Missionaries do, is absurd, when even half the benefits that the latter enjoy are provided to him. There is no good basic pay, no provision for children's education, no arrangements for medical man's and his family's medical care, no compulsory leave and no refresher courses in any of the rural, civil or canal dispensaries in the countryside or the tehsil areas. Recently a number of rural dispensaries have been provincialised. The personnel of these have been transferred to the subordinate cadre of the State Medical Service in the Punjab. All of them have been asked to start from the lowest rung with no consideration for the long service they did in the rural dispensaries under the Local Self-Government Department of the State Government. They are not entitled to any benefit on the score of that work for purpose of pensions or promotions in the new work.

Unemployment in the Profession

The problem of unemployment among the educated classes in the country is acute and the picture in the medical profession is by no means rosy. A very few of our members can expect to have a decent living. The question of their saving for the rainy day does not arise. Some just eke out a bare living, but a majority are on the verge of starvation. The cry that there is shortage of medical men in the country is out of place when the existing number of medical men cannot be suitably employed.

Unemployment in the profession can be relieved and real service done to the country if we start co-operative clinics. These clinics should be spread all over the country. Medical men should combine, pool their resources, and run them on the most efficient lines. They can ensure themselves fixed incomes and at the same time provide cheap and proper medical relief to the people, thereby helping to relieve suffering.

Equally serious is the problem of our having no economic security for the young medicos that qualify every year. A very few of them are taken up in the services, most of them at Rs. 120/- p.m. in class II A.S., with no prospects of a bright future. A number of them join the Short Service Regular Commissions in A.M.C. where they are taken for seven years and after that they can have another term of seven years. Thus they spend best part of their lives in a service where they do not get the permanency desired for proper working of the services. At times it happens that these young officers having worked there are asked to go out either to settle in private practice or seek jobs as class II A.S. These are the grievances of young graduates. I am not mentioning the fate of Licentiates who belong to a dying class which was thoroughly exploited during the last war and whose recruitment to the A.M.C. was stopped with the advent of the brown bureaucracy. It is for the medical profession to judge the action of the Military Medical Authorities in this matter. I do not want to pass any judgment.

In these hard days parents spend huge amounts for the education of their children in medical colleges. But the pay of the fresh medical men recruited as class II Assistant Surgeons is simply shocking. The meagre start of 120/- p.m. for a youngman who has spent more than 17 precious years of his life for acquiring the basic medical qualifications is absurd. Nowadays even a clerk gets more than what a fresh medical graduate gets. A mason, a carpenter and sometimes even a chaprasi gets more than what a medical man newly recruited in class II A.S. in the Punjab, Pepsu or Himachal Pradesh services is given.

Under the circumstances the only way out is for the State to step in and provide for a National Health Service.

Health, Education and Research

Our slogan should be that the country must become healthy. In making the country healthier, the Indian Medical Association has to play a leading role. Medical men should serve as saviours of the nation by sticking to the nobility of the profession. The spirit of research should be inculcated in our youngmen. It is rarely that one is born a research scholar. For research, our educational institutions have to provide facilities and create research mindedness in our youngmen, by giving them studentships and scholarships. If our medical men in services are given better pay and are asked to devote themselves to the advancement of research we will not have to look to the West to educate us and give us the necessary lead in medical science. Our youngmen would then devote their time to research rather than to money making pursuits. The institutions that do not produce men for the sake of professional work are bound to produce men of inferior quality.

Our leaders, both inside and outside the profession have been asking the members of the profession to encourage research in indigenous system of medicine. It is no use crying from house-tops for research when no facilities exist for the same, nor is there the incentive for research. If any one shows his craving and does something, he is made to leave the station and transferred to an out of the way place simply to satisfy the whims of some senior in the service out of inferiority complex and because the latter has failed to contribute anything to the literature.

In the Punjab we have two Medical Colleges, one medical school and a dental college. The Amritsar Medical College and the Christian Medical College, Ludhiana, have been upgraded only during the last ten years. The Patiala Medical College was started two years go. The number of admissions to these institutions is hardly enough to meet the demands of the Punjab, Pepsu, Himachal Pradesh and Kashmir. Youngmen have to go out to seek admission in other States where they do not get any preferential treatment.

The health authorities and the State Health Minister have been saying that the Arya Medical School will not have any extension, but at the same time they are not giving facilities for its promotion to a college. It passes one's comprehension why this institution is being given extension in small doses. Is it part of the policy of the State Government to produce licentiates for village medical relief or is it because the Punjab Government has failed to start the Chandigarh Medical College so often announced?

Few facilities for post-graduate training of our youngmen exist in the State. Most of the local bodies have to go without qualified Medical Officers of Health. There is very little scope for an independent medical practitioner to go and join the only institute imparting training in public health, as almost all the seats are reserved for State nominees.

There are few institutions in the country that have been upgraded for certain subjects. My belief is that there is none in the Punjab.

Medical Teachers

Teachers in the medical colleges should be given all the facilities for regularly getting their knowledge refreshed by arranging visits to other teaching institutions both in the country and abroad. But here again the problem arises how many institutions are there in this country that can help our young teachers refresh their knowledge. Even if there be any, there are the technical difficulties and service rules which stand in the way of their availing themselves of these facilities in other States. For this purpose there must be instituted an All-India Health Service for teachers and research workers to enable them to refresh their knowledge and avail the facilities elsewhere.

Moreover, they should be encouraged to have foreign tours and see the working of contemporary institutions. Periodical refresher courses and apprenticeships at the various centres of learning are the needs of our medical teachers. Promotions from lower ranks to the higher ones should not be a matter of time scale promotion but must be preceded by some original work as is the case in many countries, where sometimes posts of Professors remain vacant till a suitable person is found for the same. Unfortunately in our country no such criterion is fixed and vacancies are filled on personal preferences or routine grade promotions. The members of the Indian Medical Association should press on the authorities to so arrange matters in the interest of the profession that no such irregularities are committed in our State at least. This will go a long way in improving the standard of medical education and medical relief in the State.

It appears our health authorities do not want to spend more on matters concerning health and medical relief, as they believe that money spent on these does not give any returns. They little realise the contribution of preventive medicine in the form of better health.

So far no Five-Year Health Plan has been formulated in the Punjab. The least the authorities should do during the First Five Year Health Plan is to launch on a sanitation drive, provide pure drinking water and create a sense of healthful living among the masses of the state. The members of the Indian Medical Association are ever ready to extend co-operation in such nation-building activities and will help the State health authorities in educating the masses on right lines. Let the authorities come forward and avail themselves of the offer.

Medical Organisation

Members of all services, whether P.C.S. or I.A.S., can rise to the highest rank in the department and can even become secretaries of their department in the State or the Central Government, but this is not the case so far as the medical and health department is concerned. Here the Secretary of the Department is always a non-medical person. Such an anomaly does not exist in any other department. The medical men can at best be the Director, Health Services in the Punjab and there is an instance of an I.A.S. having been appointed as D.H.S. in Saurashtra. We must not only guard against such practices but should see that a medical man is appointed Secretary to the Health and Medical Department in the Punjab. We should, if possible, have a medical man as Minister as well, because he is the fittest person to judge the progress made by various institutions and schemes from time to time. There are a number of instances in the Punjab where the Health Minister has ordered disbursement of aid to unqualified and unregistered persons running institutions on commercial lines. The reply in such cases has been that it has been done to patronise the indigenous system of medicine or to give aid to an institution giving free medical aid to the sick. The plea is untenable.

Hospitals will no more be hotbeds of corruption if the staff therein is properly paid and if doctors have not to make good the deficit in their pay by private practice which is not allowed in any other department in the administration of the country. As these members of the medical profession are on duty all the 24 hours, they must get a compensatory allowance.

School Medical Service

Before I pass on to other problems I may refer to the absence of any medical examination of our school children in the State. Whenever we are in need of any statistics regarding the age-size-growth data of Indian children, we have to look to foreign countries. Our children do not compare favourably with the children in those countries. In the absence of any data we are unable to launch any health programme for the betterment of our future citizens. There may be a Child Council in the State but nothing is known about the activities of this body. No children welfare officers have been appointed. Nor has any league been formed for their betterment. Our children in the secondary classes are paying as. 4 p.m. that is Rs. 3/- p.a. per head for their medical examination. What do they get in return for that? A large number of our youngmen are rejected from the armed forces simply because no attention to diseases like trachoma was given during their school days. The worst part of it is that about Rs. 15 lacs are collected from these children as medical fees every year. Will the State authorities explain why they have not been doing anything for these school children? If the authorities have failed to introduce a scheme of midday lunches or distribution of cod liver oil or multi-vitamin tablets simply on the stereotyped plea of no finances, they are to explain to the public why they have failed to organise a school health service for the children with the amount they collect from them. The amount of Rs. 15 lacs is not a small amount. The amount given for the Medical Department after meeting the obligations of the Health Department and the Medical College is not more than Rs. 20 to 25 lacs in the Punjab. If we can provide medical relief out of this amount to the masses, it is nothing short of our inefficiency to allow this huge amount of Rs. 15 lacs to go unaccounted. In this connection I suggest that amount collected from school children should be credited to the Punjab revenues under a separate head—School Health Service; and with this amount a separate department should be run under the Medical and Health Directorate for the health and welfare of students. The government owes a duty to these students and it should spend the money taken from them for their benefit. This is an urgent problem.

Health Insurance Scheme

Recently the Health Insurance Scheme was introduced in the Punjab. The I.M.A. has been induced to accept the terms of service under the scheme. The members are professionals cum dispensing chemists. As in U.K. the authorities should take away the dispensing side of the service. Separate State dispensaries be opened in-

stead. Members of the profession be required to do their professional work only. This will enable the insured to get better medical aid and save the medical man from undue demands. There should be ample safeguards against exploitation of doctors by the labour and vice versa. Under the scheme at present the Insurance doctor is required to try his own means for getting the workers on to his list. Sometimes the authorities have blamed the profession for indulging in unprofessional tactics but have they ever thought of safeguarding him and making provision for a minimum number of workers on to his list? This they cannot do and would not like to do as this means regulation of labour and services.

In conclusion, I appeal that the I.M.A. should formulate its Five-Year Plan as is being done by the Government both at the Centre and the States. That will enable us to make a headway and organise the profession and medical relief in the State for our betterment and the betterment of the country."

RESOLUTIONS PASSED AT THE CONFERENCE

1. In view of the general complaint of the paucity of drugs and inadequacy of equipment in government dispensaries and hospitals for the poor, this conference of the Indian Medical Association urges on the government to adequately increase the budget allotment of these institutions.

2. This conference reiterates resolution No. 4 adopted at the last annual conference and views with grave concern the indifference of the government in not accepting the recommendation of bringing the graduates and the licenciates under one schedule of the register for the purpose of elections to the Punjab Medical Council. This conference further notes with regret that the government should continue to allow the existence of such a distinction between the members of one profession and urges on the government to expedite the passing of the amendment to the Punjab Medical Council Act, 1916, and to hold fresh elections of the Punjab Medical Council soon, as they are overdue since a long time.

3. This conference urges on the government to favourably consider the request of Taran Taran Ilaqa in the Amritsar district, for the establishment of a Secondary Health Centre in the Second Five Years Plan.

4. In order to improve the working of hospitals and to afford the maximum benefit to the hospital patients, and facilities for the training of the students and junior members of the staff of government hospitals, this conference is of the opinion that private practice of all medical personnel in government employ be stopped forthwith. It further recommends that in view of the arduous and hard nature of the service of these personnel, at all hours of day and night they should be adequately recompensed, and suggests that they be given at least 25 per cent more than the salary of the highest paid members of the corresponding Provincial Civil Services.

5. This conference views as unfair the prevailing practice of some manufacturers of drugs and proprietory medicines of charging different prices to the medical men and chemists and urges on the pharmaceutical houses to charge uniform price from chemists and doctors.

6. In view of the hardship existing in the Pepsu due to the Spirituous Preparations Act, this conference urges on the Pepsu Government to bring the operation of the Act in line with its counterpart in Punjab.

7. In view of the fact that it is dangerous to allow vaids, hakims and homoeopaths to play with powerful and potent allopathic drugs and injections of which they have little knowledge, this conference urges on the government to take early steps to restrict these practitioners, strictly, to their own system in which they have received training. This conference is further of the opinion that the misuse of these scarce, expensive yet useful drugs by such persons is not only detrimental to the patients, damaging to the reputation of the modern system of medicine, but also wasteful of our country's hard currency exchange and urges on the government to so amend the Vaids and Hakims Registration Act, 1949, as to prohibit the use of antibiotics, sulpha and other drugs in Schedule H of the Drugs Act, 1940, by those vaids and hakims who possess little or no knowledge of anatomy, physiology, pathology and pharmacology.

8. In view of the declared policy of the Government of India as accepted by all the State Governments including the Government of Punjab State, that the minimum qualification for the registration of a basic doctor is M.B.B.S. degree, this conference views with grave concern the fact that inspite of the promise of the government that no licentiate education would be imparted after 1952, the Arya Medical School, Ludhiana, continues to impart licentiate training. This conference urges on school authorities and the government to raise the school to the degree standard, failing which the government should not allow any further extension to carry on the licentiate training.

9. This conference urges on the Punjab Government to continue the condensed M.B.B.S. course till such time, as a fair number of licentiates come forward to avail of it.

10. In view of the facts that the present arrangements for the health examination of school children are cursory and extremely unsatisfactory, this conference is of the opinion that more medical officers be appointed on adequate remuneration so that every child may be thoroughly examined to prevent any deterioration of the health of the children under the care of the school authorities. The conference further recommends that adequate arrangements be made for dental and ophthalmic examination and of ear, nose and throat.

11. This conference strongly urges on the Government of Punjab State to take up the consideration of Punjab Health Bill which was circulated several years ago for opinion without any further delay.

12. To prevent further deterioration in the health of school children through malnutrition, this conference recommends to government to arrange that all undernourished children in primary and secondary schools in the State should be served 8 oz. of whole milk daily by the school authorities, and further recommends that the State Government must meet half the cost of the same.

13. This conference of the Indian Medical Association is firmly of the opinion that it is unethical for commercial houses manufacturing pharmaceutical preparations to advertise them over the radio and in the lay press, thereby leading to self-drugging, and urges on the profession not to patronise such preparations.

VIII GUZARAT AND SAURASHTRA PROVINCIAL MEDICAL CONFERENCE, PATAN

Under the auspices of the Gujarat and Saurashtra Provincial Branch of the Indian Medical Association, the 8th annual Conference of medical men of Gujarat and Saurashtra will be held at Patan, (North Gujarat) on 30th April—2nd May, 1955. There will be Symposia on (1) Pulmonary Tuberculosis, (2) Enlarged Prostate, (3) Anaemias in Pregnancy.

Besides, there will be discussions on "Medical Profession and the 2nd Five Year Plan."

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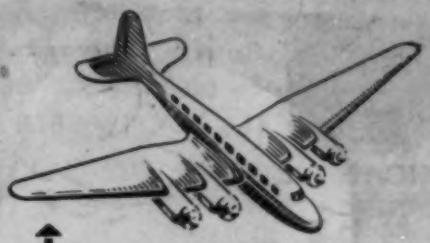

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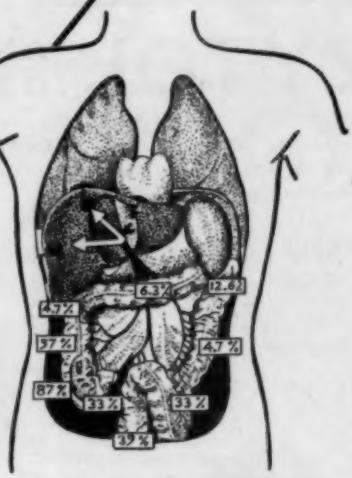

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